STANDARDS DEVELOPMENT BRANCH OMOE
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MANUAL OF GUIDELINES AND PROCEDURES

VOLUME 1

FOREWORD

PART A - AIR

PART B - WATER

PART C - WASTE

LAST REVISION: DECEMBER 31, 1994

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1994
vol. 1

Manual of Guidelines and Procedures
Ministry of Environment and Energy

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MANUAL OF GUIDELINES AND PROCEDURES

VOLUME 1

FOREWORD

PART A - AIR

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PART C - WASTE

LAST REVISION: DECEMBER 31, 1994

Ontario
Manual of Guidelines and Procedures
Ministry of Environment and Energy

FOREWORD

Last Revision: December 1994

1.0 INTRODUCTION TO THE GUIDELINES AND PROCEDURES MANUAL

2.0 MOEE MANUAL (policy typology)

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1.0 INTRODUCTION TO THE GUIDELINES AND PROCEDURES MANUAL

This Manual documents the guidelines and procedures used by Ministry of Environment and Energy (MOEE) staff in their daily operations. It is intended to provide guidance to staff of the Ministry and to inform the public of the basis of Ministry actions and decisions.

The Manual is updated as changes are made and is available electronically to Ministry staff via InfoShare and to the public via Internet. Users of hardcopy guidelines should consult the approval date, which appears on the cover page of each guideline, to ensure that they are using the most current version.

The guidelines are referenced by codes of the type G-1, with the alphabetic character signifying the chapter in the Manual to which the guideline belongs.

Procedures support specific guidelines. Procedures include the Ministry's technical and operational manuals. Lengthy manuals, or those with extensive graphics may not be included in the Manual of Guidelines and Procedures and can be obtained from the Public Information Centre. The procedures are referenced by codes of the type G-1-1, thus signifying the guideline to which they relate.

This Section includes information on the policy typology (Section 2.0), access to the Manual (Section 3.0), the guideline development and approval process (Section 4.0), a full table of contents for the manual, including associated procedures documents (Section 5.0), an alphabetical listing of all guidelines and procedures (Section 6.0) and a complete listing of acronyms and definitions (Section 7.0).

Questions relating to this Manual should be referred to the Manual Coordinator, Policy Development Branch, (416) 323-4444.

2.0 MOEE MANUAL

CONCEPT OF THE MANUAL:

The MOEE Manual is the set of documents governing operational decision-making at MOEE. It incorporates Acts for which the Ministry is responsible, Regulations which provide the rules for government action, operational policies which interpret corporate intent, and guidelines and procedures which provide the mechanisms for implementing them. It also includes Standards which are invoked either by Regulations or Operational Policies.

The Manual does not exist as a set of bound volumes. It is rather an electronic pointer rooted in the MOEE Infoshare System. This MOEE bulletin board provides a master index of documents as well as search capabilities. Most of the documents reside on Internet and Infoshare; all documents are available from the MOEE Public Information Centre.

MANUAL FRAMEWORK:

A Manual framework was established within the following constraints:

- maintain continuity with the existing lexicon (and thus minimize any potential confusion of external clients and MOEE staff);
- ensure consistency with the Ministry's policy development and approval process;
- minimize divergence from the Ministry's current (April 1994) "Manual of Guidelines and Procedures" which has been provided to MOEE staff and external clients, and placed on InfoShare and Internet; and,
- ensure consistency with EBR.

There are seven components to the Manual: Acts, Regulations, Programs, Operational Policies, Guidelines, Procedures and Standards. These are depicted in Figure 1.

The authority of each document, and similarly, the possibility of a deviation, is related to the level of approval required for the document. Figure 2 provides the levels of approval required for each and shows, for example, that deviations from a guideline must generally be approved at the level of ADM.

ENVIRONMENTAL BILL OF RIGHTS (EBR):

The Minister is required to ensure that the Ministry's Statement of Environmental Values (SEV) is considered whenever decisions which may significantly affect the environment are made. EBR does not specify requirements with respect to the various components of policy discussed below. The EBR should be referenced for specific application of its rules.

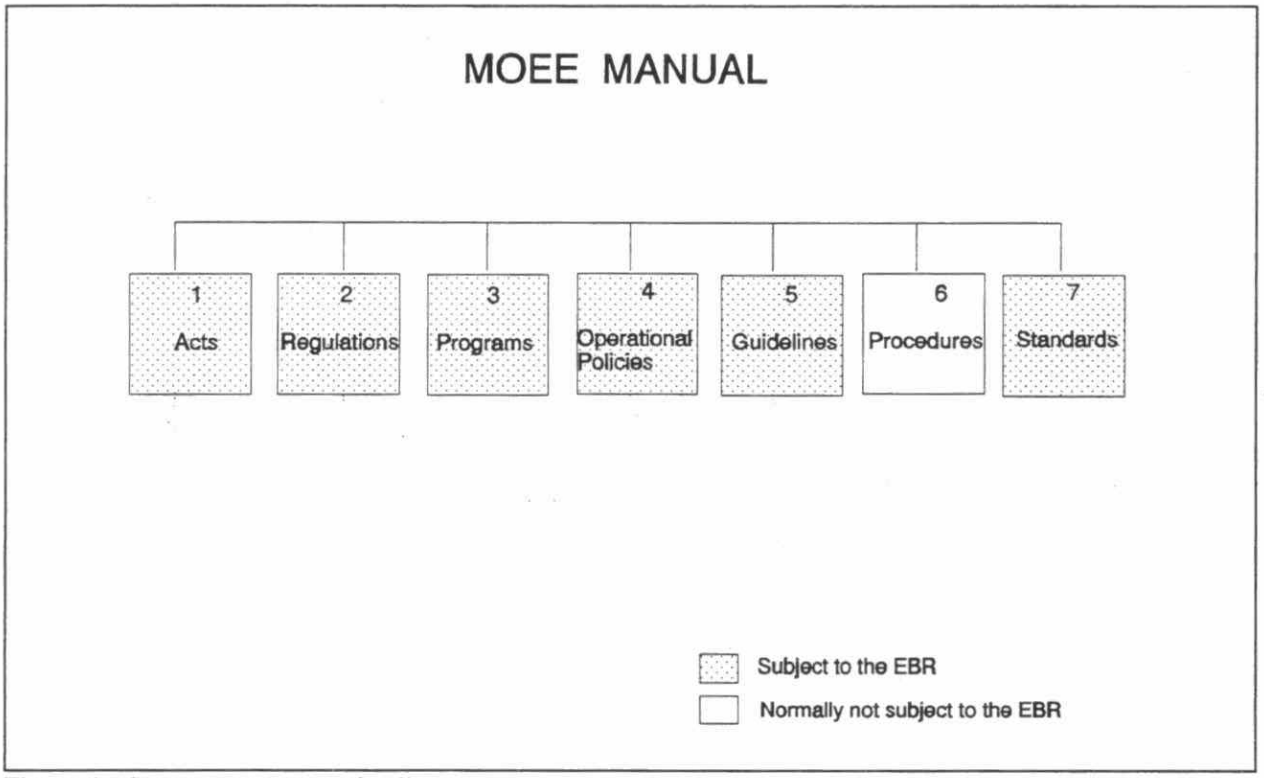

Figure 1. Seven components of policy

DOCUMENT (POLICY COMPONENT)	LEVEL OF APPROVAL REQUIRED
Act	CABINET
Regulation	CABINET (generally)
Program	DM/ADM
Operational Policy	ADM
Guideline	ADM
Procedure	Director(s)
Standard	CABINET if regulated ADM if non-regulated

Figure 2. Level of Approval required for 7 components of policy

DEFINITIONS AND EXAMPLES

ACTS are statutes and are passed by the Legislature of Ontario. They provide legal authority for government actions. (MOEE is sometimes affected by the operation of Federal statutes and may have policy instruments related to those statutes.)

Notice of proposals for Acts which could have a significant impact on the environment must be considered by the Minister, and, if it is determined the public should have an opportunity to comment, notice must be placed on the EBR Registry.

List of Acts (excluding amending Acts):

Ministry of Environment Act
Capital Investment Plan Act
Environmental Protection Act
Environmental Assessment Act
Environmental Bill of Rights Act
Niagara Escarpment Planning and Development Act
Ontario Water Resources Act
Pesticides Act
Waste Management Act

Ministry of Energy Act
Energy Efficiency Act
Ontario Energy Board Act
Ontario Energy Corporation Act
Power Corporation Act
Power Corporation Insurance Act
Rural Hydro-Electric Distribution Act
Rural Power District Loans Act

Note: Only part of the Capital Investment Plan Act (which establishes OCWA and amends the OWR Act) relates to the MOEE.

REGULATIONS are subordinate legislation made pursuant to the authority of Acts, usually by the Lieutenant Governor in Council, but sometimes by other authorities including the Minister, a Crown Corporation or a Crown Agency. Regulations establish rules and requirements through which the purpose of the Act may be achieved.

Notice of proposals for regulations, under prescribed acts, which could have a significant impact on the environment must be placed on the EBR Registry.

List of Current Regulations (excluding amending regulations):

Under Environmental Assessment Act (excluding designations and exemptions):

O. Reg. 334	General Reg.
O. Reg. 335	Rules of Practice - Environmental Assessment Bd.
O. Reg. 345/93	Private Sector Developers

Under Environmental Protection Act:

O. Reg. 336	Air Contaminants from Ferrous Foundries
O. Reg. 337	Ambient Air Quality Criteria
O. Reg. 338	Boilers
O. Reg. 339	Classes of Contaminants - Exemptions
O. Reg. 340	Containers
O. Reg. 341	Deep Well Disposal
O. Reg. 342	Designation of Waste
O. Reg. 343	Discharge of Sewage from Pleasure Boats
O. Reg. 344	Disposal Containers for Milk
O. Reg. 345	Disposal Paper Containers for Milk
O. Reg. 346	General - Air Pollution
O. Reg. 347	General - Waste Management
O. Reg. 348	Hauled Liquid Industrial Waste Disposal Sites
O. Reg. 349	Hot Mix Asphalt Facilities
O. Reg. 350	Lambton Industry Meteorological Alert
O. Reg. 351	Marinas
O. Reg. 352	Mobil PCB Destruction Facilities
O. Reg. 353	Motor Vehicles
O. Reg. 354	Municipal Sewage and Water and Roads Class Environmental Assessment Project
O. Reg. 355	Ontario Hydro
O. Reg. 356	Ozone Depleting Substances - General
O. Reg. 357	Refillable Containers for Carbonated Soft Drink
O. Reg. 358	Sewage Systems
O. Reg. 359	Sewage Systems - Exemptions
O. Reg. 360	Spills
O. Reg. 361	Sulphur Content of Fuels
O. Reg. 362	Waste Management - PCBs
O. Reg. 271/91	Gasoline Volatility
O. Reg. 77/92	Exemption for Ground Source Heat Pumps
O. Reg. 502/92	Fees for Certificates of Approval
O. Reg. 312/93	Prospectors - Exemption
O. Reg. 537/93	Petroleum Effluent Limits & Monitoring
O. Reg. 760/93	Effluent Monitoring and Effluent Limits - Pulp and Paper Sector
O. Reg. 101/94	Recycling and Composting of Municipal Waste
O. Reg. 102/94	Waste Audits and Waste Reduction Work Plans

Under Environmental Protection Act (continued):

O. Reg. 103/94	Industrial, Commercial and Institutional Source Separation Programs
O. Reg. 104/94	Packaging Audits & Packaging Reduction Work Plans
O. Reg. 189/94	Refrigerants
O. Reg. 323/94	Dry Cleaners Regulation
O. Reg. 413/94	Halon Fire Extinguishing Equipment
O. Reg. 455/94	Recovery of Gasoline Vapour in Bulk Transfers
O. Reg. 560/94	Effluent Monitoring and Effluent Limits - Metal Mining Sector
O. Reg. 561/94	Effluent Monitoring and Effluent Limits - Industrial Minerals Sector
O. Reg. 562/94	Effluent Monitoring and Effluent Limits - Metal Casting Sector
O. Reg. 717/94	Solvents
O. Reg. 718/94	Sterilants

Under Ontario Water Resources Act:

O. Reg. 900	Municipal Sewage and Water and Roads Class Environmental Assessment Projects
O. Reg. 902	Rate of Interest
O. Reg. 903	Wells
O. Reg. 503/92	Fees for Certificates of Approval
O. Reg. 435/93	Water Works & Sewage Works (Certification of Operators)

Under Pesticides Act:

O. Reg. 914	General

Under Niagara Escarpment Planning & Development Act:

O. Reg. 826	Designation of Area of Development Control
O. Reg. 827	Designation of Planning Area
O. Reg. 828	Development within the Development Control Area

Under Environmental Bill of Rights:

O. Reg. 73/94	General
O. Reg. 681/94	Classification of Proposals for Instruments

Under Energy Efficiency Act:

O. Reg. 480/91	Standards

Under Ontario Energy Board Act:

O. Reg. 869	General
O. Reg. 870	Rules of Procedures
O. Reg. 702 (R.R.O. 1980)	Uniform System of Accounts for Gas Utilities Class A
O. Reg. 188/93	Exemption

Under Power Corporation Act:

O. Reg. 931	Debt Guarantee Fees
O. Reg. 933	Water Heaters
O. Reg. 10/91	Electrical Safety Code
O. Reg. 296/91	Elliot Lake Region Economic Development Program
O. Reg. 149/92	Prescribed Investments
O. Reg. 611/92	Fees

PROGRAMS are planned and structured approaches to addressing specific environmental or energy concerns. MOEE Programs when endorsed by Cabinet are classed as Corporate. Often programs are elaborated through Acts, Regulations and guidelines. Operational programs are not endorsed by Cabinet, but are implemented in support of the Ministry's legislative mandate.

Notice of proposals for programs which could have a significant impact on the environment must be considered by the Minister, and, if it is determined the public should have an opportunity to comment, notice must be placed on the EBR Registry.

PROGRAM CRITERIA:

(1) A program should have a clear policy objective.
(2) A program must be resourced in person-years and dollars.
(3) A program has measurable results and will be routinely evaluated.

DRAFT PROGRAM LIST

This list under development.

OPERATIONAL POLICIES interpret corporate intent or focus on achievement of mandates and medium-term directions. Operational policies describe the Ministry position on an environment or energy matter and provide a basis for Ministry decision-making and a reference point for boards and tribunals. Established operational policies provide the basis for the guidelines and procedures included in the *MOEE Manual.*

Notice of proposals for operational policies which could have a significant impact on the environment must be considered by the Minister, and, if it is determined the public should have an opportunity to comment, notice must be placed on the EBR Registry.

OPERATIONAL POLICY CRITERIA:

Operational Policies are distinguished from Guidelines (see below) as follows:

List of Operational Policies

Many Guidelines (see Guidelines Section below) have an "Operational Policy" component. Regional Operations Division has identified the following documents as operational policies.

A-1 Combustion and Air Pollution Control Requirements for New Municipal and Biomedical Waste Incineration
B-1 Water Management -- Guidelines and Procedures of the Ministry of Environment and Energy (Guideline Summary)
B-5 Drinking Water Quality
B-6 Evaluating Construction Activities -- Gas/Oil Transmission Pipelines Crossing Watercourses
B-7 Incorporation of The Reasonable Use Concept into MOEE Groundwater Management Activities
B-8 Evaluating Construction Activities -- Highways and Bridges
B-9 Resolution of Groundwater Interference Problems
B-10 Evaluating Construction Activities - Marine Construction Projects
B-13 Treatment Requirements for Municipal and Communal Waterworks Using Surface Water Sources
B-14 Treatment Requirements for Municipal and Communal Waterworks Using Groundwater Sources
B-15 Use and Storage of Pesticides at Waterworks

List of Operational Policies (continued)

C-1	Mandatory or Discretionary Hearings on Waste Disposal
C-3	Approval Responsibilities for Waste Disposal
C-4	The Management of Biomedical Waste in Ontario
C-5	Registration on Title of Certificates of Approval for Waste Disposal Sites
C-6	Handling, Transportation and Disposal of Asbestos Waste in Bulk
C-7	Burning at Landfill Sites
C-9	Approval of Waste Management Systems for Dust Suppression Using a Waste Material
C-10	Removal Procedures at Sites Containing Substantial Quantities of Asbestos Waste
C-11	Handling and Disposal of Selected Wastes from Retail Motor Vehicle Servicing Facilities
C-12	Training of Drivers of Liquid Industrial or Hazardous Waste Transportation Vehicles
C-13	Engineered Facilities at Landfills that Receive Municipal and/or Non-Hazardous Wastes
C-14	Prohibition of Waste Oil for Use as a Dust Suppressant
C-16	Hazardous Waste Categorization and Review
D-1	Land Use Compatibility
D-3	Environmental Considerations for Gas or Oil Pipelines and Facilities
D-4	Land Use on or near Landfills and Dumps
E-1	The Role of the Review and the Review Participants in the EA Process
E-3	EA Planning and Approvals
E-4	Interim Expansion of Municipal Landfills
F-1	Particulate Emissions at New Cement Plants
F-2	Compliance
F-5	Levels of Treatment for Municipal and Private Sewage Treatment Works Discharging to Surface Waters
F-8	Provision and Operation of Phosphorous Removal Facilities at Municipal, Institutional and Private Sewage Treatment Works
F-9	The Use of Holding Tanks in Sewage Systems under Part VIII of the Environmental Protection Act
F-10	Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only)
F-14	Economic Analyses of Control Documents for New Municipal and Biomedical Waste Incinerators
F-15	Financial Assurance
G-1	Role of the Ministry in Spills and Emergencies
H-5	Public Consultation

GUIDELINES provide operational guidance to Ministry staff and ensure that operational policies and operational policy directions are interpreted and applied in a predictable and consistent manner.

Notice of proposals for guidelines which could have a significant impact on the environment must be considered by the Minister, and, if it is determined the public should have an opportunity to comment, notice must be placed on the EBR Registry.

List of Current Guidelines:

A-1	Combustion and Air Pollution Control Requirements for New Municipal and Biomedical Waste Incinerators
A-2	Replacement of Catalytic Converters
A-3	Operation of the Air Pollution Index (API), the Air Quality Index (AQI) and the Air Quality Advisory
A-6	Determination of Thermal Processes Allowed under Regulation 555/92 Incineration Ban
B-1	Water Management -- Guidelines and Procedures of the Ministry of Environment and Energy (Guideline Summary)
B-2	Surface Water Quality Management - Deviations
B-3	Resolution of Well Water Quality Problems Resulting from Winter Road Maintenance
B-4	Snow Disposal and De-Icing Operations in Ontario
B-5	Drinking Water Quality
B-6	Evaluating Construction Activities -- Gas/Oil Transmission Pipelines Crossing Watercourses
B-7	Incorporation of The Reasonable Use Concept into MOEE Groundwater Management Activities
B-8	Evaluating Construction Activities -- Highways and Bridges
B-9	Resolution of Groundwater Interference Problems
B-10	Evaluating Construction Activities - Marine Construction Projects
B-11	Evaluating Construction Activities - Small Scale Construction Projects
B-12	Potable Water Storage Structures
B-13	Treatment Requirements for Municipal and Communal Waterworks Using Surface Water Sources
B-14	Treatment Requirements for Municipal and Communal Waterworks Using Groundwater Sources
B-15	Use and Storage of Pesticides at Waterworks
C-1	Mandatory or Discretionary Hearings on Waste Disposal Sites
C-2	Participation in Hearings on Waste Disposal Sites
C-3	Approval Responsibilities for Waste Disposal
C-4	The Management of Biomedical Waste in Ontario
C-5	Registration on Title of Certificates of Approval for Waste Disposal Sites
C-6	Handling, Transportation and Disposal of Asbestos Waste in Bulk
C-7	Burning at Landfill Sites
C-8	Use of the "Guidance Manual for Landfill Sites Receiving Municipal Waste"
C-9	Approval of Waste Management Systems for Dust Suppression Using a Waste Material
C-10	Removal Procedures at Sites Containing Substantial Quantities of Asbestos Waste
C-11	Handling and Disposal of Selected Wastes from Retail Motor Vehicle Servicing Facilities
C-12	Training of Drivers of Liquid Industrial or Hazardous Waste Transportation
C-13	Engineered Facilities at Landfills that Receive Municipal and/or Non-Hazardous Wastes
C-14	Prohibition of Waste Oil for Use as a Dust Suppressant
C-16	Hazardous Waste Categorization and Review
D-1	Land Use Compatibility
D-3	Environmental Considerations for Gas or Oil Pipelines and Facilities
D-4	Land Use on or near Landfills and Dumps
E-1	The Role of the Review and the Review Participants in the Environmental Assessment (EA) Process
E-2	Pre-submission Consultation in the Environmental Assessment (EA) Process
E-3	Environmental Assessment (EA) Planning and Approvals
E-4	Interim Expansion of Municipal Landfills

F-1	Particulate Emissions at New Cement Plants
F-2	Compliance
F-4	Procedures for Addressing Labour Disputes Affecting Pollution Abatement
F-5	Levels of Treatment for Municipal and Private Sewage Treatment Works Discharging to Surface Waters
F-6	Sewer and Watermain Installation: Separation Distance Requirements
F-8	Provision and Operation of Phosphorous Removal Facilities at Municipal, Institutional and Private Sewage Treatment Works
F-9	The Use of Holding Tanks in Sewage Systems under Part VIII of the *Environmental Protection Act*
F-10	Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only)
F-11	Use of Farm Pollution Advisory Committee
F-14	Economic Analyses of Control Documents on Private Sector and Municipal Projects
F-15	Financial Assurance
G-1	Role of the Ministry in Spills and Emergencies
G-2	Spills Action Centre Operations
H-1	Release of Scientific Data and Reports
H-2	Public Access to Ministry of Environment and Energy Invited Submissions
H-3	Guideline on Public Access to Reports from External Parties
H-4	Research Management
H-5	Public Consultation

PROCEDURES are detailed instructions for carrying out an activity that is authorized, approved, or controlled by the Ministry, or other officials. The term "procedures" also applies to the detailed technical documents referred to in many Guidelines and Procedures.

Technical documents are usually too lengthy to incorporate directly into the Manual, and will normally be available from the appropriate operating unit of the Ministry.

A proposed procedure is not usually subject to EBR, but must be reviewed to determine whether it falls under the EBR definition of "policy".

List of Current Procedures:

A-6-1	Appendices to: Determination of Thermal Processes Allowed under Regulation 555/92 Incineration Ban
B-7-1	Determination of Contaminant Limits and Attenuation Zones.
B-7-2	Procedure for Applying Guideline B-7 to Large Subsurface Sewage Disposal Systems
B-9-1	Resolution of Groundwater Quality Interference Problems (revised 1993)
B-13-1	Granting a Variance from the Treatment Requirements for Municipal and Communal Waterworks using Surface Water Sources
B-14-1	Granting a Variance from the Treatment Requirements for Municipal and Communal Waterworks using Groundwater Sources
C-11-1	Procedures for Handling and Disposal of Selected Wastes from Retail Motor Vehicle Servicing Facilities
C-12-1	An Outline of the Essential Components of Training Programs for Drivers of Liquid Industrial or Hazardous Waste Transportation Vehicles
C-13-1	Engineered Facilities at Landfills that Receive Municipal and/or Non-Hazardous Waste
D-1-1	Land Use Compatibility: Procedure for Implementation
D-1-2	Land Use Compatibility: Specific Applications
D-1-3	Land Use Compatibility: Definitions
E-2-1	Procedures for Pre-submission Consultation in the Environmental Assessment Process

E-3-1 Interim Procedures for Environmental Assessment Planning and Approvals
F-5-1 Determination of Treatment Requirements for Municipal and Private Sewage Treatment Works Discharging to Surface Waters
F-5-2 Relaxation of Normal Level of Treatment for Municipal and Private Sewage Treatment Works Discharging to Surface Waters
F-5-3 Derivation of Sewage Treatment Works Effluent Requirements for the Incorporation of Effluent Requirements into Certificates of Approval for New or Expanded Sewage Treatment Works
F-5-4 Effluent Disinfection Requirements for Sewage Works Discharging to Surface Waters
F-8-1 Determination of Phosphorus Removal Requirements for Municipal, Institutional and Private Sewage Treatment Works
F-10-1 Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only)
F-15-1 Procedures for Financial Assurance
G-1-1 Spill Clean-up Options
H-4-1 Research Process

STANDARDS can be found in regulations or operational policy depending on where authority is derived. There is no precise legal definition of the term.

(a) Regulated standards refer to legally enforceable numerical limits. (b) Non-regulated standards, sometimes referred to as criteria or numerical objectives, are generally found in MOEE operational policies and guidelines. Standards, both regulated and non-regulated, are developed for either (1) allowable emissions and/or loadings; (2) ambient conditions; and (3) other specified activities such as acceptable buffer zones. Chemical standards officially used by the Ministry are contained in the Chemical Standards Information System (CSIS), which is maintained by the Standards Development Branch, Environmental Sciences and Standards Division.

Proposals for new or revised standards are subject to EBR where they are environmentally significant and when they fall under the EBR definition of "policy".

List of Standards:

Ontario Drinking Water Objectives (revised 1994) *(Also included in Guideline B-5)*
- Table 1. Chemical/Physical Objectives - Health Related
- Table 2. Microbiological Objectives - Health Related
- Table 3. Radionuclide Objectives - Health Related
- Table 4. Chemical/Physical Objectives - Not Health Related

Water Management (revised 1994) *(Also included in Guideline B-1)*
- Table 1. Provincial Water Quality Objectives and Guidelines

Guideline for the Protection and Management of Aquatic Sediment Quality in Ontario (August, 1993) *(Also included in Guideline B-1)*
- Table 1. Provincial Sediment Quality Guidelines for Metals and Nutrients
- Table 2a. Provincial Sediment Quality Guidelines for PCBs and Organochlorine Pesticides
- Table 2b. Provincial Sediment Quality Guidelines for Policyclic Aromatic Hydrocarbons
- Table 3. Additional Parameters

Ambient Air Quality Criteria *(Also included in O.Reg. 337)*

Energy Standards *(Also included in O.Regs. 480/91, 289/92, 528/92, 469/93)*

3.0 ACCESS TO THE MANUAL

The Manual of Guidelines and Procedures is made available to staff of MOEE through the MOEE Infoshare system. The manual can also be accessed via the MOEE Internet gopher on gov.on.ca, and by diskettes obtainable from the Policy Development Branch at (416) 323-4444.

A limited number of hardcopy manuals will be printed.

4.0 GUIDELINE DEVELOPMENT AND APPROVAL

4.1 Consultation

During the development stage, all guidelines and procedures are reviewed by appropriate Ministry staff and organizational units. Other Ministries and external stakeholders must be consulted to ensure that the requirements of the Environmental Bill of Rights are met. After internal and external consultations are complete, the guideline or procedure may be discussed by the Ministry's Policy Committee and changes made, as appropriate, prior to the responsible Assistant Deputy Minister sending the guideline to the Deputy Minister and Minister.

4.2 Steps in the Guideline Development Process

1. **Approval by Initiating ADM**(1) **to develop a guideline**
   -consults with other ADMs as appropriate
   -appoints Lead Person(2) or Working Group(3) for development of the guideline

2. **Lead Person/ Working Group consults with Policy Development Branch re:**
   Working Group composition, List of "Sign-Off Directors"(4)

3. **Lead Person/ Working Group produces a Draft Guideline**

4. **Sign-off by Directors** (*)

5. **Initiating ADM signs off on Draft Guideline** (*)
   -consults with other ADMs as appropriate

6. **To Policy Committee for corporate perspective and advice** (*)

7. **To ADMs for final review** (*)

8. **EBR Registry** (*)

9. To Policy Development Branch for entry into Manual

10. Final Notice on EBR Registry

Notes

(1)**Initiating ADM**- regardless of where the initial impetus for the policy occurs, the process is defined as beginning once the appropriate ADM approves the initiative
(2)**Lead Person**- This person will shepherd the policy through each of the required steps of development and approval
(3)**Working Group**- a broadly representative group including major Ministry stakeholders
(4)**List of Sign-Off Directors**- in addition to a core group, additional Directors who might be impacted by the developing policy would be added, depending on the specific policy
(*) - Draft Policy may be returned to the Lead Person/Working Group for amendments at any of these points

5.0 MANUAL CONTENTS

The contents of this Manual, as of the current revision date, are set out below. Those documents which are not available electronically, or are under revision, are indicated as such in the listing.

PART A **AIR GUIDELINES AND PROCEDURES**

A-1 Combustion and Air Pollution Control Requirements for New Municipal and Biomedical Waste Incinerators

A-1-1 Source Testing Code (**available from Public Information Centre as PIBS# 1310**)

A-2 Replacement of Catalytic Converters

A-3 Operation of the Air Pollution Index (API), the Air Quality Index (AQI) and the Air Quality Advisory

A-4 Crematoria (**under revision by Approvals Branch**)

A-5 Atmospheric Emissions from Stationary Combustion Turbines (**to be approved by ESSD**)

A-6 Determination of Thermal Processes Allowed under Regulation 555/92 Incineration Ban

A-6-1 Appendices to: Determination of Thermal Processes Allowed under Regulation 555/92 Incineration Ban

PART B **WATER GUIDELINES AND PROCEDURES**

B-1 Water Management -- Guidelines and Procedures of the Ministry of Environment and Energy (Guideline Summary)

B-1-1 Water Management -- Policies, Guidelines, Provincial Water Quality Objectives of the Ministry of Environment and Energy (July, 1994)

B-1-2 Revised Tables of Objectives for Ministry of Environment and Energy's Publication "Water Management" **(available from Public Information Centre as PIBS# 3303)**

B-1-3 Protection and Management of Aquatic Sediment Quality in Ontario **(available from PIC as PIBS# 1962)**

B-1-4 Fill Quality Guidelines for Lakefilling in Ontario **(available from PIC as PIBS# 1963)**

B-1-5 Deriving Receiving-Water Based, Point-Source Effluent Requirements for Ontario Waters

B-2 **(combined with B-1)**

B-3 Resolution of Well Water Quality Problems Resulting from Winter Road Maintenance

B-4 Snow Disposal and De-Icing Operations in Ontario

B-4-1 Snow Disposal and De-icing Operations in Ontario (1975) **(available from PIC as PIBS# 412-01)**

B-5 Drinking Water Quality

B-5-1 Ontario Drinking Water Objectives **(available from PIC as PIBS# 2889)**

B-6 Evaluating Construction Activities -- Gas/Oil Transmission Pipelines Crossing Watercourses

B-6-1 Evaluating Construction Activities Impacting on Water Resources (1994) **(available from PIC as PIBS# 1711)**

B-7 Incorporation of The Reasonable Use Concept into MOEE Groundwater Management Activities

B-7-1 Determination of Contaminant Limits and Attenuation Zones

B-8 Evaluating Construction Activities -- Highways and Bridges

B-9 Resolution of Groundwater Interference Problems

B-9-1 Resolution of Groundwater Quality Interference Problems (revised 1993)

B-10 Evaluating Construction Activities - Marine Construction Projects

B-11 Evaluating Construction Activities - Small Scale Construction Projects

B-12 Potable Water Storage Structures

B-13 Treatment Requirements for Municipal and Communal Waterworks Using Surface Water Sources

B-13-1 Granting a Variance from the Treatment Requirements for Municipal and Communal Waterworks using Surface Water Sources

B-13-2 Guide for Applying for Approval of Municipal and Private Water and Sewage Works **(available from PIC as PIBS# 7-02)**

B-13-3 Chlorination of Potable Water Supplies **(available from PIC as PIBS# 7-03)**

B-14 Treatment Requirements for Municipal and Communal Waterworks Using Groundwater Sources

B-14-1 Granting a Variance from the Treatment Requirements for Municipal and Communal Waterworks using Groundwater Sources

B-14-2 Design of Water Supply Systems for Small Residential Developments **(available from PIC as PIBS# 3025-02)**

B-15 Use and Storage of Pesticides at Waterworks

PART C **WASTE GUIDELINES AND PROCEDURES**

C-1 Mandatory or Discretionary Hearings on Waste Disposal Sites

C-2 Participation in Hearings on Waste Disposal Sites

C-3 Approval Responsibilities for Waste Disposal

C-3-1 Sewage Sludge Utilization on Agricultural Lands **(available from PIC as PIBS# 595)**

C-3-2 The Utilization of Waste (Other than Sewage Sludge) on Agricultural Lands **(available from PIC as PIBS# 2159)**

C-4 The Management of Biomedical Waste in Ontario

C-5 Registration on Title of Certificates of Approval for Waste Disposal Sites

C-6 Handling, Transportation and Disposal of Asbestos Waste in Bulk

C-7 Burning at Landfill Sites

C-8 Use of the "Guidance Manual for Landfill Sites Receiving Municipal Waste"

C-8-1 Guidance Manual for Landfill Sites Receiving Municipal Waste (1993) **(available from PIC as PIBS# 2741)**

C-9 Approval of Waste Management Systems for Dust Suppression Using a Waste Material

C-10 Removal Procedures at Sites Containing Substantial Quantities of Asbestos Waste

C-11 Handling and Disposal of Selected Wastes from Retail Motor Vehicle Servicing Facilities

C-11-1 Procedures for the Handling and Disposal of Selected Wastes from Retail Motor Vehicle Servicing Facilities

C-12 Training of Drivers of Liquid Industrial or Hazardous Waste Transportation Vehicles

C-12-1 An Outline of the Essential Components of Training Programs for Drivers of Liquid Industrial or Hazardous Waste Transportation Vehicles

C-13 Engineered Facilities at Landfills that Receive Municipal and/or Non-Hazardous Wastes

C-13-1 Engineered Facilities at Landfills that Receive Municipal and/or Non-Hazardous Waste

C-14 Prohibition of Waste Oil for Use as a Dust Suppressant

C-15 Decommissioning and Clean-up of Sites **(under revision)**

C-15-1 Clean-up of Contaminated Sites in Ontario **(available from PIC as PIBS# 3161)**

C-16 Hazardous Waste Categorization and Review

C-16-1 Guidance Manual for Hazardous Waste Categorization and Review Program, Volumes A and B **(available from PIC as PIBS# 1402)**

PART D LAND USE GUIDELINES AND PROCEDURES

D-1 Land Use Compatibility

D-1-1 Land Use Compatibility: Procedure for Implementation

D-1-2 Land Use Compatibility: Specific Applications

D-1-3 Land Use Compatibility: Definitions

D-2 Compatibility between Sewage Treatment and Sensitive Land Use **(not yet available)**

D-3 Environmental Considerations for Gas or Oil Pipelines and Facilities

D-4 Land Use on or near Landfills and Dumps

D-4-1 Assessing Methane Hazards from Landfill Sites (**available from PIC as PIBS# 2158-01**)

D-4-2 Environmental Warnings/Restrictions (**available from PIC as PIBS# 2158-02**)

D-4-3 Registration of Certificates and Provisional Certificates (**available from PIC as PIBS# 2158-03**)

D-5 Planning for Sewage & Water Services

D-5-1 Appendix A: Calculating & Reporting Uncommitted Reserve Capacity at Sewage & Water Treatment Plants

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D-6 Compatibility Between Industrial Facilities & Sensitive Land Uses

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PART E ENVIRONMENTAL ASSESSMENT (EA) GUIDELINES AND PROCEDURES

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F-4 Procedures for Addressing Labour Disputes Affecting Pollution Abatement

F-5 Levels of Treatment for Municipal and Private Sewage Treatment Works Discharging to Surface Waters

F-5-1 Determination of Treatment Requirements for Municipal and Private Sewage Treatment Works Discharging to Surface Waters

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F-5-3 Derivation of Sewage Treatment Works Effluent Requirements for the Incorporation of Effluent Requirements into Certificates of Approval for New or Expanded Sewage Treatment Works

F-5-4 Effluent Disinfection Requirements for Sewage Works Discharging to Surface Waters

F-6 Sewer and Watermain Installation: Separation Distance Requirements

F-6-1 Procedures to Govern Separation of Sewers and Watermains

F-7 Minimum Accepted Level of Servicing for Municipally and Privately Owned Communal Systems (**revised guideline not yet available; PIBS# 2267**)

F-8 Provision and Operation of Phosphorous Removal Facilities at Municipal, Institutional and Private Sewage Treatment Works

F-8-1 Determination of Phosphorus Removal Requirements for Municipal, Institutional and Private Sewage Treatment Works

F-9 The Use of Holding Tanks in Sewage Systems under Part VIII of the *Environmental Protection Act*

F-9-1 Manual for Onsite Sewage Systems (**available from PIC as PIBS# 2856-01**)

F-10 Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only)

F-10-1 Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only)

F-11 Use of Farm Pollution Advisory Committee

F-12 Construction Prior to Ministry Approval (**under revision**)

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F-14 Economic Analyses of Control Documents on Private Sector and Municipal Projects

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G-1 Role of the Ministry in Spills and Emergencies

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H-6 Financial Assistance for Municipal Water and Sewage Service **(revised guideline not yet available; PIBS# 577)**

H-7 Financial Assistance for Municipal Area Schemes **(revised guideline not yet available; PIBS# 577-01)**

H-8 Emergency Takeover of Facilities **(under revision)**

6.0 ALPHABETICAL LISTING OF GUIDELINES AND PROCEDURES

3Rs for Businesses and Institutions - A Development and Implementation Guide (SUPP. LIST) **PIBS 2214**

Access and Use of the Environmental Registry (EBR), Guide to (SUPP. LIST) **PIBS 3067**

Addressing Labour Disputes Affecting Pollution Abatement, Procedures for **F-4** (05-04) **PIBS 696**

Appendices to: Determination of Thermal Processes Allowed under Regulation 555/92 Incineration Ban **A-6-1***** **PIBS 3235-01**

Application of Municipal Responsibility for Communal Water and Sewage Services **D-5-2** **PIBS 2169-02**

Applying for Approval of Industrial Sewage Works, Vol. I (SUPP. LIST) **PIBS 3070-01**

Applying for Approval of Industrial Sewage Works, Vol. II (SUPP. LIST) **PIBS 3070-02**

Applying for Certificates of Approval, Guide for **PIBS 2247-01**

Applying for Provisional Certificates of Approval - Waste Management Systems (SUPP. LIST) **PIBS 3072**

Applying for the Approval of Sewage Works, A Guide on (SUPP. LIST) **PIBS 204**

Applying for the Approval of Water and Sewage Works to deal with Zebra Mussel Control, Guideline on (SUPP. LIST) **PIBS 1244**

Applying for Approval of Municipal and Private Water and Sewage Works, Guide for **B-13-2** (15-14)* **PIBS 7-02**

Applying Guideline B-7 to Large Subsurface Sewage Disposal Systems (SUPP. LIST) **PIBS 430-02**

Applying for Certificates of Approval for Waste Disposal Sites, Guide for (SUPP. LIST) **PIBS 3073-01**

Applying for the Approval of Water Works (SUPP. LIST) **PIBS 1311**

Approval of Expansion to Previously Constructed and Unapproved Facilities **F-13** (12-03) **NO PIBS**

Approval Responsibilities for Waste Disposal **C-3** (14-03) **PIBS 2159-01**

Approval of Waste Management Systems for Dust Suppression Using a Waste Material **C-9** (14-11) **PIBS 579**

Approvals for Recycling Sites, Leaf and Yard Waste Composting Sites and Compost Use as required by Ont. Reg. 101-94 (3Rs) (SUPP. LIST) **PIBS 2477**

Assessing Methane Hazards from Landfill Sites **D-4-1** (07-07) **PIBS 2158-01**

Assessment and Management of Petroleum Contaminated Sites in Ontario, Interim Guidelines for the (SUPP. LIST) **PIBS 2848**

Basic Water Treatment Operation (SUPP. LIST)	**PIBS 1093**
Burning at Landfill Sites **C-7** (14-08)	**PIBS 424**
Calculating and Reporting Uncommitted Reserve Capacity at Sewage and Water Treatment Plants **D-5-1**	**PIBS 2169-01**
Canadian Water Quality Guidelines - March 1987 (CCME) (SUPP. LIST)	**PIBS 350**
Certificates of Approval (Air), General Information (SUPP. LIST)	**PIBS 2247-2**
Chlorination of Potable Water Supplies **B-13-3** (15-14)*	**PIBS 7-03**
Clean-up of Contaminated Sites in Ontario **C-15-1** (14-17) (being rewritten)	**PIBS 3161**
Code of Practice for Used Oil Management in Canada (CCME) (SUPP. LIST)	**PIBS 1308**
Combustion and Air Pollution Control Requirements for New Municipal and Biomedical Waste Incinerators **A-1** (01-01)	**PIBS 1310-01**
Companion Document to the Hospital Waste Audit (SUPP.LIST)	**PIBS 1905-02**
Compatibility Between Industrial Facilities and Sensitive Land Uses **D-6** (07-09)	**PIBS 3272**
Compatibility between Sewage Treatment and Sensitive Land Use **D-2** (07-05)	**NO PIBS**
Compliance Manual (with attachments) **F-2-1** (05-02)**	**PIBS 1879-01**
Compliance **F-2** (05-02)	**PIBS 1879**
Construction Prior to Ministry Approval **F-12** (12-02)	**NO PIBS**
Crematoria **A-4** (01-05)	**NO PIBS**
Decommissioning and Clean-up of Sites **C-15** (14-17)	**PIBS 141**
Derivation of Sewage Treatment Works Effluent Requirements for the Incorporation of Effluent Requirements into Certificates of Approval for New or Expanded Sewage Treatment Works **F-5-3** (08-01)	**PIBS 1584-03**
Deriving Receiving-Water Based, Point-Source Effluent Requirements for Ontario Waters **B-1-5**	**PIBS 3302**

Design of Water Storage Facilities, Water Distribution Systems, Sanitary Sewage Systems & Storm Sewers (SUPP. LIST)	**PIBS 2341**
Design of Water Supply Systems for Small Residential Developments **B-14-2** (15-15)	**PIBS 3025-02**
Design Guidelines for Water Treatment Plants and Sewage Treatment Plants (SUPP. LIST)	**PIBS 1531**
Determination of Treatment Requirements for Municipal and Private Sewage Treatment Works Discharging to Surface Waters **F-5-1** (08-01)***	**PIBS 1584-01**
Determination of Thermal Processes Allowed under Regulation 555/92 Incineration Ban **A-6**	**PIBS 3235**
Determination of Contaminant Limits and Attenuation Zones **B-7-1** (15-08)	**PIBS 430-01**
Determination of Phosphorus Removal Requirements for Municipal, Institutional and Private Sewage Treatment Works **F-8-1** (08-04)	**PIBS 2250-01**
Development of the Ontario Provincial Sediment Guidelines for PCBs and the Organochlorine Pesticides (SUPP. LIST)	**PIBS 1965**
Development of the Ontario Provincial Sediment Guidelines for Arsenic, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel and Zinc (SUPP. LIST)	**PIBS 1964**
Drinking Water Quality **B-5** (15-06)	**PIBS 2889-01**
Economic Analyses of Control Documents on Private Sector Entreprises and Municipal Projects **F-14** (02-01)	**PIBS 1517**
Effluent Disinfection Requirements for Sewage Works Discharging to Surface Waters **F-5-4** (08-01)	**PIBS 1584-04**
Emergency Takeover of Facilities **H-8** (10-01)	**NO PIBS**
Emission Limits for Stationary Combustion Turbines, Guideline for (SUPP. LIST)	**PIBS 2998**
Energy Audit Guidelines (SUPP. LIST)	**PIBS 2716**
Energy Reference Manual, Banking on Efficiency (SUPP. LIST)	**PIBS 2348**
Energy Advisory Service, Retailer's Manual (SUPP. LIST)	**PIBS 2373**
Engineered Facilities at Landfills that Receive Municipal and/or Non-Hazardous Waste **C-13-1** (14-15)	**PIBS 3027-01**

Engineered Facilities at Landfills that Receive Municipal and/or Non-Hazardous Wastes **C-13** (14-15)	**PIBS 3027**
Environmental Appeal Board - Guidelines of Practice and Procedure (SUPP. LIST)	**PIBS 2257**
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Environmental Code of Practice for the Reduction of Solvent Emissions from Dry Cleaning (SUPP. LIST)	**PIBS 2297**
Environmental Code of Practice for Vapour Recovery in Gasoline Distribution Networks (CCME) (SUPP. LIST)	**PIBS 1589**
Environmental Warnings/Restrictions **D-4-2** (07-07)*	**PIBS 2158-02**
Environmental Warnings/Restrictions **D-6-4** (07-09)*	**PIBS 3272-04**
Environmental Control in the Ontario Mineral Industry (SUPP.LIST)	**PIBS 1041**
Environmental Protection Measures at Chemical Storage Facilities, Guidelines for (SUPP. LIST)	**PIBS 1421**
Environmental Considerations for Gas or Oil Pipelines and Facilities **D-3** (07-06)	**PIBS 2437**
Erosion and Sediment Control for Urban Construction Sites (SUPP. LIST)	**PIBS 490**
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Evaluating Construction Activities -- Gas/Oil Transmission Pipelines Crossing Watercourses **B-6** (15-07)	**PIBS 183-05**
Evaluating Applications for Approval of Mobile PCB Destruction Technologies (SUPP. LIST)	**PIBS 1165**
Evaluating Construction Activities -- Highways and Bridges **B-8** (15-09)	**PIBS 183-02**
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Evaluating Construction Activities Impacting on Water Resources -- Handbook for Dredging and Dredged Material Disposal in Ontario **B-6-1** (15-07)	**PIBS 1711-01** **PIBS 1711-02** **PIBS 1711-03**

Fill Quality Guidelines for Lakefilling in Ontario **B-1-4** (15-01)*	**PIBS 1963**
Financial Assistance for Municipal Water and Sewage Service **H-6** (06-01)	**PIBS 577**
Financial Assistance for Municipal Area Schemes **H-7** (06-04)	**PIBS 577-01**
Financial Assurance **F-15** (02-03)	**PIBS 226**
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Financial Assistance Program: Guidelines for Applicants **H-7-1**	**PIBS 577-01**
Financial Assistance Available through MOEE (May 1992) **H-6-1**	**PIBS 577**
Govern Separation of Sewers and Watermains, Procedures to **F-6-1** (08-02)	**PIBS 629-01**
Granting a Variance from the Treatment Requirements for Municipal and Communal Waterworks using Groundwater Sources **B-14-1** (15-15)	**PIBS 3025-01**
Granting a Variance from the Treatment Requirements for Municipal and Communal Waterworks using Surface Water Sources **B-13-1** (15-14)	**PIBS 7-01**
Handle With Care: an Outline of the Responsibilities of Generators, Carriers and Receivers of Liquid Industrial and Hazardous Waste (SUPP. LIST)	**PIBS 674**
Handling and Disposal of Selected Wastes from Retail Motor Vehicle Servicing Facilities **C-11** (14-13)	**PIBS 200**
Handling and Disposal of Selected Wastes from Retail Motor Vehicle Servicing Facilities **C-11-1** (14-13)	**PIBS 200-01**
Handling and Disposal of Biomedical Wastes from Health Care Facilities and Laboratories (SUPP. LIST)	**PIBS 425-01**
Handling, Transportation and Disposal of Asbestos Waste in Bulk **C-6** (14-07)	**PIBS 271**
Hazardous Waste Categorization and Review **C-16** (14-18)	**PIBS 1402-01**
Hazardous Waste Categorization and Review Program, Volumes A and B, Guidance Manual for **C-16-1** (14-18)**	**PIBS 1402**

Hospital Waste Audit Manual (SUPP. LIST)	**PIBS 1905-O1**
Household Hazardous Waste Collection and Facility Guidelines (SUPP.LIST)	**PIBS 2344**
Hydrogeologic Assessment of Proposed Hearings Process (SUPP.LIST)	**PIBS 3028**
Incinerator Design and Operating Criteria (Biomedical Waste Incinerators) (SUPP. LIST)	**PIBS 102-2**
Incinerator Design and Operation (General), Guidance for (SUPP.LIST)	**PIBS 102-1**
Incinerator Design and Operation (Cremators), Guidance for (SUPP.LIST)	**PIBS 102-3**
Incorporation of The Reasonable Use Concept into MOEE Groundwater Management Activities **B-7** (15-08)	**PIBS 430**
Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment **D-5-4**	**PIBS 2169-04**
Industrial Waste Sampling Procedures Manual (SUPP. LIST)	**PIBS 339**
Industrial Categorization Criteria **D-6-1**	**PIBS 3272-01**
Interim Stormwater Quality Control Guidelines for New Development (SUPP. LIST)	**PIBS 2094**
Interim Procedures for Environmental Assessment Planning and Approvals **E-3-1** (03-04)	**PIBS 986-01**
Interim Expansion of Municipal Landfills **E-4** (03-05)	**PIBS 3218**
Land Use Compatibility: Specific Applications **D-1-2** 07-3	**PIBS 3166-02**
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Land Use Compatibility: Procedure for Implementation **D-1-1** (07-03)	**PIBS 3166-01**
Land Use Compatibility: Definitions **D-1-3** (07-03)	**PIBS 3166-03**
Landfill Sites Receiving Municipal Waste (1993), Guidance Manual for **C-8-1** (14-09)**	**PIBS 2741**
Levels of Treatment for Municipal and Private Sewage Treatment Works Discharging to Surface Waters **F-5** (08-01)	**PIBS 1584**
Management of Biomedical Waste in Ontario **C-4** (14-05)	**PIBS 425**

Management of Waste Containing PCBs (CCME), Guidelines for the (SUPP. LIST)	**PIBS 1532**
Mandatory or Discretionary Hearings on Waste Disposal Sites **C-1** (14-01)	**PIBS 3217**
Manual for Onsite Sewage Systems **F-9-1** (08-05)*	**PIBS 2856-01**
Minimum Accepted Level of Servicing for Municipally and Privately Owned Communal Systems **F-7** (08-03)	**PIBS 2267**
Mobile PCB Treatment System (SUPP. LIST)	**PIBS 1533**
Mobile PCBs Destruction Systems (CCME) (SUPP. LIST)	**PIBS 1086**
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Municipal Oil Shortage Contingency Plans (SUPP. LIST)	**PIBS 2419**
National Guidelines for Decommissioning Industrial Sites (CCME) (SUPP. LIST)	**PIBS 1819**
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National Guidelines on Physical-Chemical Biological Treatment of Hazardous Waste (CCME) (SUPP. LIST)	**PIBS 1818**
National Guidelines for Hazardous Waste Incineration Facilities (CCME) (SUPP. LIST)	**PIBS 2188-01** **PIBS 2188-02**
Ontario Drinking Water Objectives **B-5-1** (15-06)*	**PIBS 2889**
Ontario Air Quality Index System, A Guide to (SUPP. LIST)	**PIBS 1472**
Ontario Phase-out of Ozone-Depleting Substances - A Compliance Guide (SUPP. LIST)	**PIBS 1316**
Ontario's Used Oil Collection Program, A Compliance Guide (SUPP. LIST)	**PIBS 2161**
Operation of Air Pollution Index (API), the Air Quality Index (AQI) and the Air Quality Advisory **A-3** (01-04)	**PIBS 1472-01**
Outline of the Essential Components of Training Programs for Drivers of Liquid Industrial or Hazardous Waste Transportation Vehicles **C-12-1** (14-14)	**PIBS 1515-01**
Packaging Audits and Reduction Workplans, A Guide to (SUPP. LIST)	**PIBS 2482**

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Particulate Emissions at New Cement Plants **F-1** (05-01)	**PIBS 3024**
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Preparing Environmental Assessment Proposals, Guideline for (SUPP LIST)	**PIBS 3251**
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Procedural and Regulatory Responsibilities of Hydrogeologists in the Review and Hearing Process (SUPP. LIST)	**PIBS 3026**
Prohibition of Waste Oil for Use as a Dust Suppressant **C-14** (14-16)	**PIBS 3234**
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Provision and Operation of Phosphorous Removal Facilities at Municipal, Institutional and Private Sewage Treatment Works **F-8** (08-04)	**PIBS 2250**
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Quality Assurance Policy and Guideline - 1986 (SUPP. LIST)	**PIBS 361**

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Registration of Certificates and Provisional Certificates **D-4-3***	**PIBS 2158-03**
Registration on Title of Certificates of Approval for Waste Disposal Sites **C-5** (14-06)	**PIBS 3073**
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Resolution of Well Water Quality Problems Resulting from Winter Road Maintenance **B-3** (15-04)	**PIBS 3233**
Revised Tables of Objectives for Ministry of Environment and Energy's Publication "Water Management" **B-1-2** (15-01)*	**PIBS 586-02**
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Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only) **F-10** (08-06)	**PIBS 3074**

Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only) **F-10-1** (08-06) **PIBS 3074-01**

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Sewage Sludge Utilization on Agricultural Lands **C-3-1** (14-03)* **PIBS 595**

Sewer and Watermain Installation: Separation Distance Requirements **F-6** (08-02) **PIBS 629**

Snow Disposal and De-Icing Operations in Ontario **B-4** (15-05) **PIBS 412**

Snow Disposal and De-Icing Operations in Ontario (1975) **B-4-1** (15-05)* **PIBS 412-01**

Soil Clean-up Guidelines for Decommissioning of Industrial Lands: Background and Rationale for Development (SUPP. LIST) **PIBS 1448**

Source Testing Code **A-1-1** (01-01)* **PIBS 1310**

Source Separation of Recyclable Materials and Leaf and Yard Waste Systems for Municipalities (3R's) (SUPP. LIST) **PIBS 2476**

Source Separation of Recyclable Materials for Industrial, Commercial and Institutional Sectors - Multi-unit Residential Buildings (3R's) (SUPP. LIST) **PIBS 2478**

Spill Clean-up Options **G-1-1** (13-01) **PIBS 2821-01**

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Stream Water Quality Assessment Procedures Manual (SUPP. LIST) **PIBS 749**

Surface Water Quality Management - Deviations **B-2** (15-02) **PIBS 3220**

Technical Considerations in the Assessment of Hydrogeologic Reports, Guideline: (SUPP. LIST) **PIBS 3029**

The Use of Holding Tanks in Sewage Systems under Part VIII of the *Environmental Protection Act* **F-9** (08-05) **PIBS 2856**

Training of Drivers of Liquid Industrial or Hazardous Waste Transportation Vehicles **C-12** (14-14) **PIBS 1515**

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Urban Drainage Design Guidelines (SUPP. LIST) **PIBS 409**

Use of the "Guidance Manual for Landfill Sites Receiving Municipal Waste" **C-8** (14-09) **PIBS 2741-01**

Use of Chlorine, Sulphur Dioxide and Ammonia in Water and Sewage Treatment Works in the Province of Ontario (SUPP. LIST) **PIBS 2093**

Use of Farm Pollution Advisory Committee **F-11** (12-01) Procedure **PIBS 2101**

Use and Storage of Pesticides at Waterworks **B-15** (11-01) **PIBS 1661**

Utilization of Waste (Other than Sewage Sludge) on Agricultural Lands (Draft Interim) **C-3-2** (14-03)* **PIBS 2159**

Waste Audits and Reduction Workplans for Industrial, Commercial and Institutional Sectors (3R's) (SUPP. LIST) **PIBS 2480**

Waste Audits and Reduction Workplans for Construction and Demolition Projects (3R's) (SUPP. LIST) **PIBS 2481**

Waste Management Planning Vol. 3 - Users Reference Guide to Statutes, Regulations, Policies, Guidelines and Procedures (SUPP. LIST) **PIBS 3096**

Water Management -- Guidelines and Procedures of the Ministry of Environment and Energy (Guideline Summary) **B-1** (15-01) **PIBS 586-01**

Water Management -- Policies, Guidelines, Provincial Water Quality Objectives of the Ministry of Environment and Energy ("The Blue Book") **B-1-1** (15-01) **PIBS 3303**

*Not available in electronic form
**Very large document
***Electronic version missing graphics Revised:December 29, 1994

7.0 ACRONYMS AND GLOSSARY

LIST OF ACRONYMS

ACES	Advisory Committee on Environmental Standards
API	Air Pollution Index
AQI	Air Quality Index
BOD5	5-day Biochemical Oxygen Demand
CH Act	Consolidated Hearings Act
C of A	Certificate of Approval
EA	Environmental Assessment
EA Act	Environmental Assessment Act
EBR	Environmental Bill of Rights
EP Act	Environmental Protection Act
ERP	Environmental/Emergency Response Personnel
ESR	Environmental Study Report
FA	Financial Assurance
FOIPOP	Freedom of Information and Protection of Privacy Act
FPIMB	Fiscal Planning and Information Management Branch
HCl	Hydrochloric Acid
IEB	Investigations and Enforcement Branch
IMAC	Interim Maximum Acceptable Concentration
kg/h	kilograms per hour
kPa	kilopascals
MAC	Maximum Acceptable Concentration
MDC	Maximum Desirable Concentration
MMA	Ministry of Municipal Affairs
MNR	Ministry of Natural Resources
MOEE	Ministry of Environment and Energy
MOH	Ministry of Health
MPP	Member of Provincial Parliament
MTO	Ministry of Transportation of Ontario
NEB	National Energy Board
NTU	Nephelometric Turbidity Units
O2	Oxygen
OCWA	Ontario Clean Water Agency
ODWO	Ontario Drinking Water Objectives
OEB	Ontario Energy Board
OPA	Official Plan Amendment
OPAC	Ontario Pesticides Advisory Committee
OPCC	Ontario Pipeline Coordination Committee
OPSS	Ontario Provincial Standards Specification
ORIS	Occurrence Reporting Information System
OWRA	Ontario Water Resources Act

PAC	Public Advisory Committee
PLC	Public Liaison Committee
ppb	parts per billion
ppmv	parts per million by volume
PSC	Pre-Submission Consultation
PWQO	Provincial Water Quality Objectives
R	reference conditions
RAC	Research Advisory Committee
RAP	Remedial Action Plan
RTS	Research Technology Section
SAC	Spills Action Centre
SS	Suspended Solids
TP	Total Phosphorus
U.S. EPA	United States Environmental Protection Agency

GLOSSARY OF TERMS

Abatement:
Measures to bring about compliance, usually focused directly on the prevention, reduction and elimination of pollution. (Guideline F-2)

Adjacent Property:
See Guideline B-7, Section 3.3.3 ("The incorporation of the reasonable use concept into the groundwater management activities of the Ministry of Environment and Energy")

Adverse Effect:
As defined in the Environmental Protection Act, means one or more of: (i) impairment of the quality of the natural environment for any use that can be made of it; (ii) injury or damage to property or to plant or animal life; (iii) harm or material discomfort to any person; (iv) an adverse effect on the health of any person; (v) impairment of the safety of any person; (vi) rendering any property or plant or animal life unfit for use by man; (vii) loss of enjoyment of normal use of property; and (viii)interference with the normal conduct of business. (Procedure D-1-3)

Adverse Meteorological Conditions:
Wind speed, wind direction, turbulence (wind fluctuations) or temperature variations, alone or in combination, which prevent the efficient dispersal of pollutants into the atmosphere.
(Guideline A-2)

Affected Parties:
Any members of the public or public interest groups with an interest in the undertaking [or the long-term solution (Guideline E-4)], as well as government reviewers (Guideline E-3) and the EA Advisor (Guideline E-2)

After-Market (Grade) Catalytic Converter:
A catalytic converter manufactured for installation on a motor vehicle as a replacement for a catalytic converter originally installed on the vehicle by the vehicle manufacturer. (Guideline A-2)

Air Pollution Alert System:
A system which warns of deteriorating air quality. (Guideline A-2)

Air Pollution Episode:
An occasion when air contamination is at such a level and for such a period of time that the air contamination may cause increased human sickness and mortality. (Guideline A-2)

Air Pollution Index (API):
A series of numbers expressing the relative levels of air pollution and taking into consideration one or more contaminants (as provided for under O. Reg. 346). The API protects human health by triggering control actions designed to curb or prevent air pollution episodes associated with these contaminants during periods of adverse meteorological conditions. (Guideline A-3)

Air Quality Index (AQI):
A numerical expression of air quality for specific locations in the province derived from air quality measurements at those locations. To produce the index at a particular location, levels of one or more contaminants over various critical averaging times are expressed relative to standards applicable to those contaminants and averaging times to produce a sub-index or sub-indices. After calculation of each of these sub-index values, the highest of these is taken as the Air Quality Index. One of the AQI sub-index values may be the API sub-index. If the API sub-index is the highest of the sub-indices, then the API is the basis of the AQI. (Guideline A-3)

Amenity Area:
An outdoor space or facility that is used for the enjoyment of persons residing in or utilizing any building(s) on the property/premises. (Procedure D-1-3)

Approval:
As defined in Section 131 of the EP Act. (Guideline F-15)

Approval Authority:
The government body or official Ministry person, committee, board or other decision-making body responsible for making the final environmental decision on the sponsor's application or proposal. (Guideline H-5)

Arbitration:
Stakeholders and the sponsor may agree to delegate decision-making authority to a third party in cases where the decision has a high degree of controversy and consensus is unlikely using other modes of involvement. (Guideline H-5)

Asbestos Waste in Bulk:
Asbestos waste that is handled in reusable rigid containers that are part of the collection vehicle and that, when lined, use a single impermeable liner. (Guideline C-6)

Benefit-Cost Analysis:
A framework that involves the identification, quantification and valuation of the costs and benefits associated with defined programs and alternative courses of action. (Guideline F-14)

Biomedical Waste:
See Guideline C-4.

Buffer:
In a land use context, a buffer can be: (1) a space; or (2) a feature; or (3) a land use; or (4) any combination of the above, interposed between two conflicting land uses for the purpose of reducing or eliminating the adverse effects of one land use upon the other. A buffer may be open space, where distance alone is relied upon to produce the desired results, or it may be a berm, wall, trench, fence or other structure (e.g., solid brick walls, tripleglazed windows to lessen the effect of noise) or planting, or other land use different from the two conflicting ones, but compatible with both. (Procedure D-1-3)

Buffer Area:
The air, land and/or water between a "facility" and nearby "sensitive land use", where land use controls are used to eliminate or minimize "adverse effects". It can be of variable size, shape and composition to produce the desired results and apply to all or part of an "influence area". A "buffer area", depending upon the circumstances, may be on or off site, or both. (Procedure D-1-3)

Burner Flame Front:
The visible luminous front zone of the flame, formed by the burner, in which intense localized gas-phase combustion occurs. (Guideline A-1)

Catalyst:
An agent which assists or varies a chemical reaction but which remains unchanged at the end of the reaction. (Guideline A-2)

Catalytic Converter:
A device through which exhaust from a gasoline or diesel powered motor is passed to prevent or lessen the emission of a contaminant. Use of leaded gasoline impairs a catalytic converter's ability to function. (Guideline A-2)

Certificate of Approval:
The authorization for the operation of a waste disposal site, including the terms or conditions of the certificate. (Guideline C-2)

Class I Industrial Facility:
A place of business for a small scale, self contained plant or building which produces/ stores a product which is contained in a package and has low probability of fugitive emissions. Outputs are infrequent, and could be point source or fugitive emissions for any of the following: noise, odour, dust and/or vibration. There are daytime operations only, with infrequent movement of products and/or heavy trucks and no outside storage. See Appendix A of draft MOEE Policy 07-09: "Compatibility Between Industrial Facilities and Sensitive Land Uses" for classification criteria and examples to categorize a specific industry. (Procedure D-1-3)

Class II Industrial Facility:
A place of business for medium scale processing and manufacturing with outdoor storage of wastes or materials (i.e., it has an open process) and/or there are periodic outputs of minor annoyance. There are occasional outputs of either point source or fugitive emissions for any of the following: noise, odour, dust and/or vibration, and low probability of fugitive emissions. Shift operations are permitted and there is frequent movement of products and/or heavy trucks during daytime hours. See Appendix A of draft MOEE Policy 07-09: "Compatibility Between Industrial Facilities and Sensitive Land Uses" for classification criteria and examples to categorize a specific industry. (Procedure D-1-3)

Class III Industrial Facility:
A place of business for large scale manufacturing or processing, characterized by: large physical size, outside storage of raw and finished products, large production volumes and continuous movement of products and employees during daily shift operations. It has frequent outputs of major annoyance and there is high probability of fugitive emissions. See Appendix A of draft MOEE Policy 07-09: "Compatibility Between Industrial Facilities and Sensitive Land Uses" for classification criteria and examples to categorize a specific industry. (Procedure D-1-3)

Class 4 Sewage System:
A septic tank system. (Guideline F-9)

Class 5 Sewage System:
A sewage system which requires or uses a holding tank for the storage or retention of hauled sewage at the site where it is produced prior to its collection by a Class 7 sewage system.
(Guideline F-9)

Class 6 Sewage System:
A sewage system in which sewage is treated in a proprietary aerobic sewage treatment plant. (Guideline F-9)

Class 7 Sewage System:
A hauled sewage system. (Guideline F-9)

Combustion Air:
The air supplied to the incinerator for the burning of the waste and/or the fuel. (Guideline A-1)

Combustion Gas Residence Time:
The mean period of time, after most of the mixing and combustion has been completed and the temperature fully developed, during which the combustion gases are maintained at the specified minimum temperature and oxygen content. (Guideline A-1)

Committed Land Use:
A land use in accordance with federal, provincial or municipal plans, by-laws and/or zoning orders, which has been approved by the regulatory authority, but is not yet existing. (Procedure D-1-3)

Compatible Land Use:
An existing or "committed land use" or activity that can co-exist with a neighbouring use/activity or uses/activities, without either creating or experiencing 1 or more off-site "adverse effect(s)". (Procedure D-1-3)

Compliance:
A state achieved by adhering to the legislative and regulatory requirements of the Ministry, which cover a wide range of activities, including: the prevention, reduction and elimination of pollution; the obtaining of approvals and licences; and the completion of routine paperwork and the filing of reports.
(Guideline F-2)

Compressor Station:
Usually consists of a reciprocating or turbine type compressor powered by an electric, internal combustion or jet turbine engine which maintains the desired operating pressure within the pipeline system and moves the gas or oil. (Guideline D-3)

Consultation:
The sponsor retains the decision-making authority but consults the public and stakeholders to seek input which may influence and improve the decision. (Guideline H-5)

Contaminant Attenuation Zone:
See Guideline B-7, Section 3.3.2 ("The incorporation of the reasonable use concept into the groundwater management activities of the Ministry of Environment and Energy")

Contaminating Life Span:
The period of time during which the landfill will produce contaminants at levels that could have unacceptable impact if they were to be discharged into the surrounding environment.
(Guideline C-13)

Control Document:
A document which is authorized by statute, binding upon the recipient, and directly enforceable by prosecution. (Guideline F-15) These include Minister's reports, licences, permits, Certificates of Approval, notices of intent, orders, Control Orders, requirements and directions, and program approvals. For purposes of this guideline, a Control Document will also refer to a prosecution. (Guideline F-14)

Cost-Effectiveness Analysis:
An economic analytical technique which involves a comparison of the costs of alternative methods to achieve a pre-specified objective or beneficial effect; or, determination of the method that will achieve the highest amount of a given objective or effect for a fixed level of input or expenditure. (Guideline F-14)

Cytotoxic Drugs:
Drugs possessing a specific destructive action designed specifically to destroy certain cells, including antineoplastic drugs that selectively kill dividing cells. (Guideline C-4)

Cytotoxic Waste:
Waste cytotoxic drugs and includes: (a) leftover or unused cytotoxic drugs, and (b) tubing, tissues, needles, gloves and any other things which have come into contact with a cytotoxic drug. (Guideline C-4)

Deviation:
Deviation from Surface Water Quality Management Policy 2 (as described in the Ministry publication "Water Management") refers to instances where, in areas with water quality not meeting Provincial Water Quality Objectives (PWQO), it is not possible, for reasons specified in Guideline B-2, Section 2.1, to prevent further degradation of existing water quality. (Guideline B-2)

Dewatering:
The removal of impounded water or groundwater from the construction area during trenching. (Guideline D-3)

Director:
A person appointed as Director, for Part VIII, EP Act, either from Ministry staff, or officials of Health Units. (Guideline F-9)

Disposal Site:
See Guideline B-7, Section 3.3.1 ("The incorporation of the reasonable use concept into the groundwater management activities of the Ministry of Environment and Energy")

Driver Training Program:
A training program designed specifically for drivers of vehicles used for the transportation of liquid industrial or hazardous wastes. (Guideline C-12)

Dust Suppressant:
A waste used for dust suppression in accordance with a Certificate of Approval or Provisional Certificate of Approval for a dust suppression waste management system. (Guideline C-9)

Dust Suppressant Site:
A waste disposal site where a dust suppressant is deposited.
(Guideline C-9)

Economic Analysis:
The application of economic principles to identify and evaluate the consequences of particular courses of action or changes in policy. Includes benefit-cost, cost-effectiveness and/or financial effects analyses. The incidence or distribution of these consequences and values among different groups, economic sectors and/or regions is also determined. (Guideline F-14)

Emergency:
Defined by the Emergency Plans Act as: "A situation caused by the forces of nature, an accident, an intentional act or otherwise that constitutes a danger of major proportions to life or property." (Guideline G-1)

Enforcement:
In general, enforcement entails the investigation by the staff of the Investigations and Enforcement Branch with a view to prosecution or other action to compel compliance or punish non-compliance with the legislative and regulatory requirements of the Ministry. (Guideline F-2)

Environment:
For the purposes of this guideline, the environment includes: the subsurface; water within the subsurface; and the path traversed during the movement of contaminants (from the surface to the subsurface, from the subsurface to the surface, and within the subsurface). (Guideline B-9)

Environmental Assessment (EA) Advisor:
Normally, the Environmental Planner from the EA Branch who advises proponents and affected parties on pre-submission consultation (PSC) and EA Act requirements. (Guideline E-2)

Environmental Measures:
As defined in Section 131 of the EP Act. (Guideline F-15)

Environmental Objectives:
Numerical or qualitative objectives specified in Control Documents (orders or approvals). Include, but not limited to: maximum allowable flow rates, pollutant concentrations (in air or water-borne pollutant releases), pollutant loadings per unit time, etc.. (Guideline F-14)

Existing Biomedical Waste Incinerator:
An incinerator put into operation before December 31, 1985, and owned by a hospital within the meaning of the Public Hospitals Act at which biomedical waste, but no hauled liquid industrial waste or other hazardous waste, is incinerated. (Guideline C-4)

External Parties:
Any organizations, companies, agencies or individuals submitting reports pursuant to the Ministry's role in the management of emissions, depositions and discharges to the natural environment. (Guideline H-3)

Facility (def'n #1):
A transportational, commercial, industrial, agricultural, intensive recreational or utilities/services building or structure and/or associated lands (e.g., abattoir, airport, railway, sewage treatment plant, landfill, manufacturing

plant, hydro generation stations, sports/concerts stadium, etc.) which produce(s) one or more "adverse effect(s)" on a neighbouring property or properties. (Procedure D-1-3)

Facilities (def'n #2):
Stations (e.g., valve, compressor and metering) which move, store, regulate and meter the natural gas or oil, and include underground storage pools for storing large inventories of gas. (Guideline D-3)

Feed Rate:
The weight of waste introduced or fed into the incinerator per unit time. (Guideline A-1)

Financial Analysis:
The application of economic analytical techniques to estimate the economic and financial effects (both costs and benefits) of specific environmental requirements on individuals, firms, corporations, Crown corporations or municipalities. (Guideline F-14)

Financial Assurance (FA):
One or more of the mechanisms listed in Section 131 of the EP Act by which one party guarantees its performance to another party (such as the Government). (Guideline F-15)

Fill Area:
The area of a waste disposal site set aside for landfilling or dumping. (See Conceptual Diagram No. 1, Guideline D-4)

Fugitive Emissions:
Reasonably expected/predictable contaminant occurrences associated with normal operational practices and procedures (e.g., materials handling or outdoor storage) of industrial facilities, which are generally difficult to practically control at the source or on-site. These emissions are not point sources (i.e., not from stacks or vents). Fugitive emissions are from all other sources. These emissions may include odour, noise, vibration and particulate such as dust. (Procedure D-1-3)

Gas-Phase Turbulence:
Turbulence in the combustion gases, denoting an irregular fluctuation (i.e., mixing and eddying) superimposed on the main stream. Good mixing of the products of incomplete combustion (primarily carbon monoxide and hydrocarbons) and of the combustion air is promoted by a highly turbulent flow of the gases. (Guideline A-1)

Groundwater Quality Interference:
The deterioration of the quality of groundwater resulting from the release of contaminants. (Guideline B-9)

Guarantor:
A third party, such as an insurance company, which will issue an assurance or a surety bond. (Guideline F-15)

Health Care Facilities:
See Guideline C-4.

Hydrostatic Testing:
A procedure undertaken to test the engineering integrity of the pipeline by pumping water in at high pressure for a specified period of time to identify any leaks prior to putting the pipeline in service. (Guideline D-3)

Industry/Industrial Land Use/Facility:
A facility or activity relating to: the assemblage and storage of substances/goods/raw materials; their processing and manufacturing; and/or the packaging and shipping of finished products. (Procedure D-1-3)

Infilling:
Development on vacant lots or underdeveloped lots within a built-up area. (Procedure D-1-3)

Influence Area/Potential Influence Area:
The area(s) at, above or below grade, associated with a "facility" that is subject to one or more "adverse effect(s)" which may be of varying duration, frequency and distance of disposal. This is an actual "influence area". A "potential influence area" identifies where adverse effects are generally expected to occur. An "influence area" or "potential influence area" acts as a potential constraint for "sensitive land use", or conversely on the establishment of a "facility", unless evidence is provided that "adverse effects" are not a problem, or can be satisfactorily mitigated to the level of "trivial impact". (Procedure D-1-3)

Interim Expansion:
The use, operation, alteration, enlargement or extension of a landfill(s) for a stated period of time, beyond the limits in the current Certificate of Approval or provisional Certificate of Approval. Limits typically fix the size of the site, the total volume of waste, the nature of the waste, the final contours of the site, the date upon which waste will cease to be accepted, etc.. (Guideline E-4)

Interim Maximum Acceptable Concentration (IMAC):
A health-related objective established for parameters for which there is insufficient toxicological data to establish a MAC with reasonable certainty. When it is not feasible for practical reasons to establish a MAC at a desired level, an IMAC may be established at an achievable level. (Guideline B-5)

Landfill:
Land where waste is deposited under controlled conditions, compacted into cells and covered at regular intervals. (Guideline E-4)

Land Use:
Any existing or proposed activity, structure, service, facility, or natural feature, either at, above, or below grade, which conforms to an approved municipal plan. (Guideline D-4)

Land Use Compatibility:
A recognized factor and principle of good land use planning, whereby land uses which are known or expected to cause environmental problems for one another, when in proximity, are deemed incompatible and are protected from one another by separation and/or other means. (Procedure D-1-3)

Land Use for Waste Disposal Purposes:
The land comprising the fill area, where landfilling or dumping has occurred, and the land which is being used for, or is to be used for, the leachate buffer area and/or the gas buffer area. The land may be on or off-site. (See Conceptual Diagram No. 1, Guideline D-4)

Light Duty (Motor) Vehicle:
A motor vehicle, other than a motorcycle, with a gross vehicle weight of 2,720 kilograms or less. (Guideline A-2)

Long-Term Solution:
The municipality's long-term plan for management of the wastes for which it is responsible. This plan will require approval under the EA Act, either as facilities are proposed or as a total Waste Management Master (System) Plan. (Guideline E-4)

Major Interest Reports:
Reports which detail significant public health or environmental issues. (Guideline H-3)

Major Spill:
A spill of such magnitude and nature that it presents a hazard to human health or causes serious adverse effects over a wide area, and for which the Ministry may be required to assume control of the clean-up and restoration activities. (Guideline G-1)

Maximum Acceptable Concentration (MAC):
Limits applied to substances above which there are known or suspected adverse health effects. (Guideline B-5)

Maximum Desirable Concentration (MDC):
Limits on substances which, when present at concentrations above the limits, are either aesthetically objectionable to an appreciable number of consumers or may interfere with good water quality control practices. (Guideline B-5)

Mediation:
The sponsor facilitates or negotiates agreement among stakeholders about an environmental issue which has a high degree of controversy. (Guideline H-5)

The Minister:
The Ontario Minister of Environment and Energy.

The Ministry:
The Ontario Ministry of Environment and Energy.

Minor Spill:
A spill of such magnitude and nature that does not cause significant adverse effects or public concerns, where the spiller can, utilizing his/her own resources, undertake the necessary measures to control, contain and clean up the material spilled. (Guideline G-1)

Mobile Health Care:
Human or animal health care provided at a location which is not (a) a health care facility, (b) the professional office of a health professional within the meaning of the Regulated Professions Act, 1991, or (c) the professional office of a member of the College of Veterinarians of Ontario. (Guideline C-4)

Moderate Spill:
A spill of such magnitude and nature that causes significant adverse effects in the immediate vicinity of the spill, where the resources under a municipal or co-operative contingency plan may be required to effectively contain and clean up the material spilled. (Guideline G-1)

Modified Biomedical Waste Incinerator:
An incinerator which is to undergo major modification to the incinerator and/or its air pollution control system, process or mode of operation. (Guideline C-4)

Negative Pressure:
A pressure that is less than ambient pressure. (Guideline A-1)

New Biomedical Waste Incinerator:
An incinerator which was approved on or after January 23, 1989. (Guideline C-4)

Occurrence Report:
A document, prepared by Ministry staff, in which situations which may require abatement or enforcement action are reported and recommendations for action identified. (Guideline F-2)

Operating Parameters:
The variables of the incinerator process and waste stream used to control the operation of the incinerator. These include: the waste feed rate, composition, and heating value; combustion air feed rate(s); and heat losses and production. (Guideline A-1)

Order:
As defined in Section 131 of the EP Act. (Guideline F-15)

Part VIII System:
A sewage system as defined in the EP Act, RSO 1990, Part VIII, Section 74. (Guideline F-9)

Participation:
The sponsor delegates limited decision-making to a group of stakeholders in order to move toward a consensus on key areas where there is disagreement among the stakeholders. (Guideline H-5)

Peripheral Area:
The area controlled by the site owner/operator between the boundary of the waste disposal site and the fill area. Together, the peripheral area and the fill area make up the waste disposal site. The peripheral area will contain the buffer areas required to be on-site. (See Conceptual Diagram No. 1, Guideline D-4)

Pesticide:
Any organism, substance or device used directly or indirectly to control, prevent, destroy, mitigate, attract or repel any pest, including: herbicides for use in the control of weeds; fungicides for the control of fungal organisms; insecticides for use in controlling lawn and garden insects and/or structural pests associated with the interior or exterior of waterworks facilities; and rodenticides for the control of rats or mice. (Guideline B-15)

Potable Water:
Water from ground or surface sources that is supplied for human consumption. (Guideline B-12)

Potable Water Storage Structures:
A structure where potable water is stored for use by consumers. (Guideline B-12)

Primary and Secondary Chambers:
The primary combustion chamber, also called the lower or combustion chamber, is where the waste is introduced, progressively dried, volatilized (gasified), ignited and combusted. Combustion is maintained by supplying the chamber with combustion air and heat from the primary chamber burner when necessary. The gases flow from the primary combustion chamber to the secondary combustion chamber, also called the afterburner, where additional combustion air is mixed with the combustible gases to ensure their complete combustion. (Guideline A-1)

Program Director:
Ministry official who is responsible for developing, issuing and enforcing the order or approval or a designate. Called the "Director" in the Ontario EP Act and the Ontario Water Resources Act; may be a Regional Director or Director of the Approvals Branch. Directors employed by local boards of health, regional municipalities and elsewhere outside the Ministry are, for purposes of contracts between the Minister and their employer under Part VIII of the EP Act, also Program Directors.
(Guideline F-15)

Proponent:
The organization responsible for the planning and implementation of the undertaking. (Guideline E-2, E-3) The municipality responsible for the undertaking. (Guideline E-4)

Proposed Land Use:
A land use which is being put forward for consideration for an official plan amendment or a zoning by-law amendment in conjunction with an application for a plan of subdivision or a plan of condominium, or other land use planning related matters. (Procedure D-1-3)

Public:
Any person or group other than the Ministry or the consultation sponsor. (Guideline H-5)

Redevelopment:
Where existing land uses are being phased out and replaced by another type of designated land use as part of a land use plan or proposal which has been substantiated by studies and is in accordance with a municipal official plan policy or other formally approved plan. (Procedure D-1-3)

Reference flue gas conditions:
Reference flue gas conditions are defined as follows (in Guideline A-1):

Temperature	25° C
Pressure	101.3 kPa
Oxygen content	11%
Water content	nil (dry conditions)

Regulated Party:
An individual, private company, corporation or other entity which is subject to an order or approval (Guideline F-14) and must provide financial assurance. (O. Guideline F-15)

Reports:
Any document submitted directly to the Ministry by an external party which quantifies any contaminant or material emitted, deposited or discharged, or proposed to be emitted, deposited or discharged to the natural environment, or which describes measures to contain or control such contaminant or material. (Guideline H-3)

Research:
An investigative study undertaken on a systematic basis to increase the available store of scientific and technical knowledge, and the use of this knowledge in new applications and problem solving. Routine monitoring programs, technical surveys and the implementation of abatement measures are, by definition, excluded from the research category. (Guideline H-4)

Residual Oxygen:
The amount of oxygen (usually expressed in percent on a dry basis) in the combustion gases exiting the secondary combustion chamber or the location where the one-second residence time ends. (Guideline A-1)

Retail Motor Vehicle Servicing Facility:
Retail gasoline service stations, retail automotive repair garages, retail car washes and retail service centres at automobile dealerships. This includes service centres for: (a) mufflers, (b) brakes, (c) body repair, (d) undercoating, (e) snowmobiles, and (f) pleasure boats. (Guideline C-11)

Review Co-ordinator:
The environmental planner from the Environmental Assessment Branch who co-ordinates the review. (Guideline E-1)

Review Participants:
The review co-ordinator and the reviewers constitute the review participants. (Guideline E-1)

Reviewers:
All other contributors to the review, including Ministry staff responsible for technical input based on the Ministry's mandate of environmental protection. (Guideline E-1)

Sediment:
Solid or soil-like material at the bottom of a watercourse or waterbody. (Guideline D-3)

Sensitive Land Use:
A building, "amenity area" or outdoor space where routine or normal activities occurring at reasonably expected times would experience 1 or more "adverse effect(s)" generated by a nearby "facility". The "sensitive land use" may be a part of the natural or built environment. Depending upon the particular "facility" involved, a sensitive land use and associated activities may include one or a combination of: (i) residences or sleeping facilities for people (e.g., single and multi-unit dwellings, nursing homes, hospitals, trailer parks, camping grounds, etc.); (ii) a permanent structure for non-facility related use, particularly of an institutional nature (e.g., schools, churches, community centres, day care centres; or (iii) certain outdoor recreational uses deemed by a municipality or other level of government to be sensitive (e.g., trailer park, picnic area, etc.); (iv) certain agricultural operations (e.g., cattle raising, mink farming, cash crops and orchards); or (v) bird/wildlife habitats or sanctuaries. (Procedure D-1-3)

Separation Distance:
The linear measurement between a "facility" property/properties and a "sensitive land use/uses". The distance should be adequate to reduce or eliminate the "adverse effects" of one land use upon the other, so that at most there would only be a "trivial impact". (Procedure D-1-3)

Sewers/Sewage Works:
Includes sanitary sewers, sanitary forcemains, storm sewers, and storm force mains, together with all appurtenances and fittings. (Guideline F-6)

Sharps:
Medical or veterinary implements and equipment intended to be sharp for the purpose of cutting or piercing. (Guideline C-4)

Significant Impact:
Where contaminant discharges cause or are likely to cause an "adverse effect" under the Environmental Protection Act, R.S.O. 1990, Section 14. In determining whether an "adverse effect" will occur, the timing and magnitude of the "facility's" "adverse effect(s)" must be related to the "sensitive land use's" normal use period(s). (Procedure D-1-3)

Single Chamber Mass Burning Incinerator:
A single chamber incinerator with a waterwall or refractory-lined construction, a grate onto which the waste is fed, and provisions for the supply of combustion air both beneath (underfire air) and above (overfire air) the grate. The waste is usually introduced into the incinerator with little or no preprocessing. (Guideline A-1)

Spill:
A discharge of a pollutant into the natural environment from, or out of, a structure, vehicle or other container which is abnormal in quality or quantity in light of all the circumstances of the discharge. If a spill causes or is likely to cause any of the following adverse effects, it must be reported and cleaned up: (a) impairment of the quality of the natural environment for any use that can be made of it; (b) injury or damage to property or

to plant or animal life; (c) harm or material discomfort to any person; (d) adverse effects on the health of any person; (e) impairment of the safety of any person; (f) the rendering of any property or plant or animal life unfit for use by man; (g) the loss of enjoyment of normal use of property; or (h) interference with the normal conduct of business. (Guideline G-1)

Spiller:
(a) For purposes of spill reporting responsibilities, the spiller is defined as "every person who has control of a pollutant that is spilled and every person who spills or causes or permits a spill of a pollutant that causes, or is likely to cause, an adverse effect"; or (b) for purposes of spill clean-up responsibilities, the spiller is defined as "the owner of a pollutant and the person having control of a pollutant that is spilled and that causes or is likely to cause an adverse effect." (Guideline G-1)

Sponsor:
A person, group or organization, including the Ministry, which promulgates a proposal and consults the public to assist in environmental decision-making. (Guideline H-5)

Spreader Stoker Incinerator:
A single chamber incinerator in which waste is blown with air into the incinerator furnace through a pneumatic charging system. Waste is burned in suspension and on a travelling grate. The incinerator includes provisions for the supply of combustion air both beneath (underfire air) and above (overfire air) the grate. (Guideline A-1)

Stakeholder:
A member of the public who may be directly or indirectly affected by the decision. (Guideline H-5)

Three Way Converter:
A catalytic converter which is capable of reducing emissions of carbon monoxide, hydrocarbons and oxides of nitrogen.
(Guideline A-2)

Treated Biomedical Waste:
See Guideline C-4.

Trivial:
A present or predictable impact generated by a "facility" which will be so minor that it would not be construed to be an "adverse effect". In determining whether an impact will be "trivial", the timing and magnitude of the "facility's" operations and outputs can be related to the "sensitive land use's" normal use period(s). (Procedure D-1-3)

Undertaking:
Interim expansion of the landfill(s); a detailed description of the proposed undertaking is used to apply for the necessary EP Act approval. (See Section 5.3, Guideline E-4)

Vectors and Vermin:
Disease-carrying organisms, insects, rodents, birds (especially gulls) and other harmful creatures (e.g., bears). (Guideline D-4)

Waste Oil:
Any oil no longer required for its intended use. Such oils would include crankcase, hydraulic, electrical and emulsified oil or mixtures of such oils and any other materials. (Guideline C-14)

Waterworks:
Any works for the collection, production, treatment, storage, supply and distribution of water, or any part of such works, but does not include plumbing to which the Building Code Act, 1992 applies. (Guideline B-15)

8.0 CONCORDANCE

Old Guideline No.	New Guideline Number
01-01	A-1
01-02	A-2
01-03	A-1
01-04	A-3
01-05	A-4
02-01	F-14
02-02	deleted
02-03	F-15
03-01	E-1
03-02	deleted
03-03	E-2
03-04	E-3
03-05	E-4
05-01	F-1
05-02	F-2
05-03	F-2
05-04	F-4
05-05	F-2
06-01	H-6
06-02	to OCWA
06-03	to OCWA
06-04	H-7
06-05	to OCWA

07-02	deleted
07-03	D-1
07-04	deleted
07-05	D-2
07-06	D-3
07-07	D-4
08-01	F-5
08-02	F-6
08-03	F-7
08-04	F-8
08-05	F-9
08-06	F-10
10-01	H-8
11-01	B-15
12-01	F-11
12-02	F-12
12-03	F-13
13-01	G-1
13-02	G-2
14-01	C-1
14-02	C-2
14-03	C-3
14-04	deleted
14-05	C-4
14-06	C-5
14-07	C-6
14-08	C-7
14-09	C-8
14-10	deleted
14-11	C-9
14-12	C-10
14-13	C-11
14-14	C-12
14-15	C-13
14-16	C-14
14-17	C-15
14-18	C-16

15-01	B-1
15-02	B-2
15-03	deleted
15-04	B-3
15-05	B-4
15-06	B-5
15-07	B-6
15-08	B-7
15-09	B-8
15-10	B-9
15-11	B-10
15-12	B-11
15-13	B-12
15-14	B-13
15-15	B-14
16-00	H-5
16-01	H-1
16-02	deleted
16-03	deleted
16-04	deleted
16-05	H-4
16-06	H-2
16-07	H-3
16-08	H-4
16-09	H-5

MANUAL OF GUIDELINES AND PROCEDURES

PART A - AIR

December 31, 1994

PART A - AIR

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A-1-1 Source Testing Code **(available from Public Information Centre as PIBS# 1310)**

A-2 Replacement of Catalytic Converters

A-3 Operation of the Air Pollution Index (API), the Air Quality Index (AQI) and the Air Quality Advisory

A-4 Crematoria **(under revision)**

A-6 Determination of Thermal Processes Allowed under Regulation 555/92 Incineration Ban

A-6-1 Appendices to: Determination of Thermal Processes Allowed under Regulation 555/92 Incineration Ban

GUIDELINE A-1
(formerly 01-01 & 01-03)

Combustion and Air Pollution Control Requirements for New Municipal and Biomedical Waste Incinerators

Legislative Authority:

Environmental Protection Act, Part V, Section 27, and Part II, Section 9
Ontario Regulation 347, General -- Waste Management Regulation
Ontario Regulation 346, General -- Air Pollution

Responsible Director:

Director, Science and Technology Branch

Last Revision Date:

April, 1994

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SYNOPSIS

This guideline applies to municipal and biomedical waste incinerators. The Ministry will enforce the guideline by imposing conditions on Certificates of Approval in accordance with the requirements of the *Environmental Protection Act*, Part V, Section 27, and Part II, Section 9.

The guideline seeks to minimize contaminant air emissions from new incineration systems by requiring proper control of the combustion process and establishing minimum design and operating parameters for the evaluation of combustion. The Ministry will also consider these parameters when evaluating existing incinerators and assessing proposals for their upgrading.

The guideline also requires the installation of state-of-the-art air pollution control systems, sets air emission limits for particulate and hydrogen chloride, and establishes requirements for the control, monitoring and performance testing of incineration systems. Emission limits specified in this guideline will be reviewed and updated from time to time by the Ministry to reflect best available test data and control guidelines and/or regulations published by the Canadian federal government and others. Control systems which comply with the requirements of this guideline will also reduce the emissions of metals and acidic gases.

1.0 Introduction

Regulation 347, Section 12.1, with specific exceptions, prohibits the establishment or operation of municipal waste incinerator sites in Ontario. The exceptions include:

- incinerators for which approval to proceed was given under the *Environmental Assessment Act*, or for which a Certificate of Approval (or provisional Certificate of Approval) was issued under Part V of the *Environmental Protection Act* on or before September 26, 1992;

- incinerators put into operation before September 26, 1992 for which no Certificate of Approval was required under Part V of the *Environmental Protection Act*; and

- incinerators designed to exclusively handle the incineration of unpreserved wood waste, pulp mill sludge, paper mill sludge, paper de-inking sludge, animal carcasses (not pathological waste), and waste which would be hazardous or liquid industrial waste, except for applicable small quantity exemptions.

This guideline establishes minimum design and operating parameters, emission control systems and emission limits which will ensure control of emissions to the atmosphere from incinerator systems. It also provides criteria which the Ministry will consider for evaluating existing incinerators and assessing proposals for their upgrading.

The requirements specified in this guideline are in addition to those in Regulation 346 (RRO 1990), General -- Air Pollution, including compliance with the point of impingement standards prescribed in Schedule 1 to that regulation.

The requirements are also in addition to those in Guideline C-4: "Management of Biomedical Waste in Ontario".

2.0 Definitions

Burner Flame Front:

The visible luminous front zone of the flame, formed by the burner, in which intense localized gas phase combustion occurs.

Combustion Air:

The air supplied to the incinerator for the burning of the waste and/or the fuel.

Combustion Gas Residence Time:

The mean period of time, after most of the mixing and combustion has been completed and the temperature fully developed, during which the combustion gases are maintained at the specified minimum temperature and oxygen content.

Feed Rate:

The weight of waste introduced or fed into the incinerator per unit time.

Gas-Phase Turbulence:

Turbulence in the combustion gases, denoting an irregular fluctuation (i.e. mixing and eddying) superimposed on the main stream. Good mixing of the products of incomplete combustion (primarily carbon monoxide and hydrocarbons) and of the combustion air is promoted by a highly turbulent flow of the gases.

Negative Pressure:

A pressure that is less than ambient pressure.

Operating Parameters:

The variables of the incinerator process and waste stream used to control the operation of the incinerator. These include: the waste feed rate, composition, and heating value; combustion air feed rate(s); and heat losses and production.

Primary and Secondary Chambers:

The primary combustion chamber, also called the lower or combustion chamber, is where the waste is introduced, progressively dried, volatilized (gasified), ignited and combusted. Combustion is maintained by supplying the chamber with combustion air and heat from the primary chamber burner when necessary.

The gases flow from the primary combustion chamber to the secondary combustion chamber, also called the afterburner, where additional combustion air is mixed with the combustible gases to ensure their complete combustion.

Reference flue gas conditions:

Reference flue gas conditions are defined as follows:

- Temperature 25°C
- Pressure 101.3 kPa
- Oxygen content 11%
- Water content nil (dry conditions)

Residual Oxygen:

The amount of oxygen (usually expressed in percent on a dry basis) in the combustion gases exiting the secondary combustion chamber or the location where the one-second residence time ends.

Single Chamber Mass Burning Incinerator:

A single chamber incinerator with a waterwall or refractory-lined construction, a grate onto which the waste is fed, and provisions for the supply of combustion air both beneath (underfire air) and above (overfire air) the grate. The waste is usually introduced into the incinerator with little or no pre-processing.

Spreader Stoker Incinerator:

A single chamber incinerator in which waste is blown with air into the incinerator furnace through a pneumatic charging system. Waste is burned in suspension and on a travelling grate. The incinerator includes provisions for the supply of combustion air both beneath (underfire air) and above (overfire air) the grate.

3.0 Abbreviations

HCl	hydrogen chloride or hydrochloric acid
kg/h	kilograms per hour
kPa	kilopascals
O_2	oxygen
ppmv	parts per million by volume
R	reference conditions

4.0 Guideline Requirements

4.1 Combustion in Incinerators

4.1.1 Incineration Temperature

Incinerators shall be capable of maintaining, on a continuous basis, an incineration temperature of at least 1100°C, and shall operate at a temperature of not less than 1000°C. They shall incorporate an auxiliary burner to provide this minimum operating temperature:

- at start-up before the commencement of the incineration cycle;
- during shutdown until all combustion of waste has ceased; and
- when necessary during other phases of operation.

4.1.2 Combustion Air Distribution

Primary and secondary combustion air systems for incinerators shall be designed to control air distribution. Control systems shall provide the capability to adjust the distribution of combustion air and to automatically adjust the quantity of combustion air to respond to the range of waste properties, incinerator feed rates, and irregularities in loading and/or burning patterns in the incinerator.

4.1.3 Residence Time

Incinerators shall be designed for a combustion gas residence time of not less than one second at 1000°C. This residence time shall be calculated from the point where most of the combustion has been completed and the incineration temperature has fully developed.

(a) Multi-chamber Incinerators

In multi-chamber incinerators, the residence time shall be calculated from the secondary burner(s) flame front. If air is introduced downstream of the burner flame front, residence time shall be calculated from the final air injection point.

(b) Single-chamber Incinerators

Where the furnace is one continuous space, such as in "spreader stoker" and "single chamber mass burning" designs, the location of the complete combustion/fully developed temperature point shall be determined by an overall design review, and may be significantly downstream of the final air injection point.

4.1.4 Oxygen Availability

Incinerators shall be designed to provide and shall operate at not less than 6% residual oxygen in the flue gas exhaust during the incineration cycle.

4.1.5 Turbulence and Mixing

Incinerators shall be designed to provide and maintain a high degree of gas phase turbulence and mixing in the secondary combustion zone. Provisions shall include any combination of: appropriately located/directed air jets, changes of flue gas flow direction, baffling, and constriction of cross-sectional flue gas flow area.

4.1.6 Range of Operation

Incinerators shall be designed to achieve the temperature, residence time, oxygen availability and turbulence requirements of this guideline over the entire expected range of values of the incinerator operating parameters, including:

- feed rate (including minimum and maximum rates);
- ultimate analysis, heating value, ash and moisture content of the waste;
- combustion air; and
- heat losses.

4.1.7 Pressure Control and Emergency Exhaust

Incinerators shall be designed to operate under negative pressure during all phases of operation. Emergency exhausts shall not be located prior to the point at which the one-second residence time at 1000°C has been achieved.

4.1.8 Control and Monitoring Systems

Incinerators shall incorporate control and monitoring systems to ensure, readily indicate and confirm that the requirements of this guideline, as well as other Ministry standards, regulations and guidelines, are consistently met. Control and monitoring systems shall be capable of readily signifying and correcting any aspect of a substandard operation.

4.1.9 Continuous Monitoring Parameters

Continuously monitored parameters shall include temperature(s), total hydrocarbons (or carbon monoxide), and opacity. Monitoring may also be required for residual oxygen, carbon dioxide, incinerator exhaust flue gas volume, hydrogen chloride, sulphur oxides, nitrogen oxides and other parameters. Continuous monitors shall be equipped with recording devices for subsequent reference and analysis.

4.2 Air Pollution Controls For Incinerators

The emission limits listed in 4.2.1 through 4.2.4 will be reviewed and updated from time to time.

4.2.1 Particulate Outlet Concentration

Air pollution control systems for incinerators shall achieve a maximum guaranteed outlet particulate loading of not greater than 20 mg/Rm^3 (Reference cubic metre).

NOTE: For mobile incinerators and incinerator units with capacities less than 400 kg/h, the outlet particulate concentration of 20 mg/Rm^3 shall be considered as a target in evaluating state-of-the-art control systems.

4.2.2 Hydrochloric Acid (HCl) Removal

Air pollution control systems for incinerators shall achieve either a guaranteed HCl removal efficiency of not less than 90%, or a maximum guaranteed HCl outlet concentration of 30 ppmv (at 11% O_2). This is equivalent to approximately 50 mg/m^3.

4.2.3 Continuous Operation

Air pollution control systems for incinerators shall be designed to operate on a continuous basis whenever there is waste burning in the incinerator. The design of the system shall incorporate consideration of:

- the conditions which could lead to an unscheduled shutdown of the air pollution control system;
- means of ameliorating such conditions; and
- air pollution control bypassing which cannot be avoided.

The incinerator system controls shall be designed to ensure the shutdown of the incinerator immediately upon an unscheduled shutdown of the air pollution control system in a manner that will minimize air emissions. The control system shall also be designed to record pertinent information for subsequent reporting to the local District Office of the Ministry, and for an assessment of the reasons for the shutdown and potential measures to prevent a recurrence.

4.2.4 Performance Tests

The Director of the Ministry's Approvals Branch will determine the frequency of performance tests.

The guaranteed removal efficiency and/or outlet loadings as described above in sections 4.2.1 and 4.2.2 shall be demonstrated by performance test programs approved by the Science and Technology Branch and, where applicable, by methods included in the Source Testing Code (Procedure A-1-1).

Performance tests shall be undertaken within six months of start-up and, thereafter, at a frequency determined by the Director. The performance test results shall be used to define the acceptable range of feed rates, operating procedures and range of readings for continuous monitoring devices. Any exceedance of the acceptable range for any monitor shall be reported to the local District Office of the Ministry.

GUIDELINE A-2
(formerly 01-02)

Replacement of Catalytic Converters

Legislative Authority:

Environmental Protection Act, Section 22 (3)
Ontario Regulation 353

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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4.1 Effectiveness of Replacement Units
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4.3 Non-Contravention of *EP Act*, Section 22 (3)
4.4 Reconditioned or Remanufactured Catalytic Converters
4.5 Manufacturers' and Distributors' Responsibilities

SYNOPSIS

This guideline provides authority for the sale and use of replacement catalytic converters (part of emission control systems) on light duty vehicles in Ontario, under specified conditions.

1.0 Introduction

A separate guideline covering replacement catalytic converters is required, since Section 22(3) of the *Environmental Protection Act* states:

> "Where a manufacturer installs on, attaches to or incorporates in any motor or motor vehicle, a system or device to prevent or lessen the discharge of any contaminant, no person shall remove or cause or permit the removal of such system or device from any such motor or motor vehicle, except for repair of such system or device, or for replacement of such system or device by a system or device of the same type." RSO 1990, c. E.19, s.22(3)

This would appear to instruct owners and installers, in the event of failure or replacement of original factory installed catalytic converters, to use only catalytic converters of exactly the same type. Replacement catalytic converters, manufactured specifically for the purpose, at a considerably lower cost and known as "after-market catalytic converters", can achieve acceptable performance comparable to original equipment that has been in use for five years. The requirement to use only original equipment would impose unnecessary expense on owners and likely lead to increases in non-compliance.

2.0 Definitions

Catalytic Converter:

A device through which exhaust from a gasoline or diesel powered motor is passed to prevent or lessen the emission of a contaminant. Use of leaded gasoline impairs a catalytic converter's ability to function.

Catalyst:

An agent which assists or varies a chemical reaction but which remains unchanged at the end of the reaction.

After-market (Grade) Catalytic Converter:

A catalytic converter manufactured for installation on a motor vehicle as a replacement for a catalytic converter originally installed on the vehicle by the vehicle manufacturer.

Light Duty (Motor) Vehicle:

A motor vehicle, other than a motorcycle, with a gross vehicle weight of 2,720 kilograms or less.

Three Way Converter:

A catalytic converter which is capable of reducing emissions of carbon monoxide, hydrocarbons and oxides of nitrogen.

3.0 Conditions for Use of the Guideline

3.1 Conditions where "original equipment" grade converters must be used:

If a catalytic converter malfunctions before the vehicle attains both 80,000 kilometres and five years from the date of original licence issuance, the converter must be replaced with a catalytic converter identical to that originally installed on the vehicle by the manufacturer.

3.2 Conditions where "after-market" grade converters may be used:

If a catalytic converter malfunctions after the vehicle attains either 80,000 kilometres or after five years from the date of original licence issuance, an after-market converter, approved by the Ministry may be installed on a motor vehicle of the appropriate type or class in place of the malfunctioning catalytic converter.

4.0 Guideline Provisions

4.1 Effectiveness of replacement units

Where a manufacturer can show that its after-market catalytic converters are capable of reducing the level of pollution emitted from the tailpipe of a type or class of light duty motor vehicle by a prescribed amount for a period of at least two years or a distance of at least 40,000 kilometres, such a catalytic converter may be sold in Ontario, and be installed and used on light duty motor vehicles of the appropriate type or class in accordance with Section 3.2. Where the original converter was a three-way converter, the prescribed reductions shall be:

Carbon Monoxide	70%
Hydrocarbons	70%
Nitrogen Oxides	30%

(where the original converter was a three-way converter)

These reductions are not intended to replace the requirements of Regulation 353 which remain in effect.

4.2 Use of Manufacturers' Identification Codes

Where a manufacturer of after-market catalytic converters has obtained a set of identifying code letters from the United States Environmental Protection Agency (U.S. EPA), the manufacturer shall stamp on or affix to the shell of the catalytic converter the designated code letters. An after-market catalytic converter shall not be sold in Ontario unless it has the manufacturer's identification code on the shell, if available, or otherwise an identification code issued by the Ministry.

4.3 Non-contravention of *EP Act*, Section 22(3)

Where an after-market catalytic converter is sold, installed and used in accordance with Section 3.2, such sale, installation and use shall not be deemed to be a contravention of the provisions of Section 22(3) of the *EP Act.*

4.4 Reconditioned or remanufactured catalytic converters

This guideline statement does not give approval for the sale, installation or use of reconditioned or re-manufactured catalytic converters.

4.5 Manufacturers' and Distributors' Responsibilities

(a) A manufacturer or distributor shall only sell, or offer for sale, an after-market catalytic converter in Ontario after satisfactorily supplying the Ministry with the following data:

  (i) a list of applicable vehicles on which each after-market catalytic converter can be installed; and

  (ii) test results proving that the product is capable of controlling carbon monoxide, hydrocarbons, and nitrogen oxides (where applicable) to the required level for at least two years or 40,000 kilometres, and,

(b) A manufacturer or distributor shall stamp on, or affix to, the shell of each catalytic converter to be offered for sale in Ontario, the relevant U.S. EPA identification code, if available, or otherwise an identification code issued by the Ministry.

(c) The identification code shall be located on the bottom surface of the catalytic converter shell so as to be easily legible when the catalytic converter has been installed on a vehicle.

(d) A manufacturer or distributor shall not sell, or offer for sale, an after-market catalytic converter in Ontario until the Ministry has issued a letter to the manufacturer or distributor stating that the after-market catalytic converter meets the relevant conditions set out in this guideline.

GUIDELINE A-3
(formerly 01-04)

Operation of the Air Pollution Index (API), the Air Quality Index (AQI) and the Air Quality Advisory

Legislative Authority:

Environmental Protection Act, Part I, Section 3(f)
Ontario Regulation 346, Section 4

Responsible Director:

Director, Environmental Monitoring and Reporting Branch

Last Revision Date:

April, 1994

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4.2 AQI
4.3 Control Actions

5.0 METHOD AND FREQUENCY OF REPORTS OF AQI AND API LEVELS TO THE PUBLIC

5.1 API
5.2 AQI

SYNOPSIS

The Ministry produces two numerical indices based upon current air quality data -- the Ontario Air Pollution Index and the Air Quality Index. These indices, although structurally related, have different objectives and enforcement mechanisms. Authority for the Air Pollution Index, and for the control measures associated with it, is contained in O.Reg. 346, S.4. The Air Quality Index is produced and disseminated under the provisions of the *Environmental Protection Act*, Part I, Section 3(f). It is used primarily as an information tool. In addition, when levels of ground level ozone above a threshold level of 80 ppb are observed or forecast from the Air Quality Index Program, the Ministry will issue Air Quality Advisories.

1.0 Introduction

The Ministry releases two numerical indices based on current measurements of air pollution in various communities throughout Ontario -- the Air Pollution Index and the Air Quality Index. This guideline outlines the objectives of these two indices and describes actions the Ministry shall take in connection with them to control pollutant emissions to the atmosphere.

2.0 Definitions

Air Pollution Index (API):

A series of numbers expressing the relative levels of air pollution and taking into consideration one or more contaminants (as provided for under O. Reg. 346). The API protects human health by triggering control actions designed to curb or prevent air pollution episodes associated with these contaminants during periods of adverse meteorological conditions.

Air Quality Index (AQI):

A numerical expression of air quality for specific locations in the province derived from air quality measurements at those locations. To produce the index at a particular location, levels of one or more contaminants over various critical averaging times are expressed relative to standards applicable to those contaminants and averaging times to produce a sub-index or sub-indices. After calculation of each of the sub-index values, the highest of these is taken as the Air Quality Index. One of the AQI sub-index values may be the API sub-index. **If the API sub-index is the highest of the sub-indices, then the API is the basis of the AQI.**

Adverse Meteorological Conditions:

Wind speed, wind direction, turbulence (wind fluctuations) or temperature variations, alone or in combination, which prevent the efficient dispersal of pollutants into the atmosphere.

Air Pollution Episode:

An occasion when air contamination is at such a level and for such a period of time that the air contamination may cause increased human sickness and mortality.

Air Pollution Alert System:

A system which warns of deteriorating air quality.

3.0 Purpose of the API and AQI

3.1 Purpose of the API

The API is the basis of an Air Pollution Alert System designed to protect human health. This system provides a means for controlling emissions of sulphur dioxide and suspended particulate matter from stationary sources of pollution when adverse meteorological conditions prevail and elevated ground level concentrations of these contaminants are predicted.

3.2 Purpose of the AQI

The AQI provides communities with information on the current air quality in areas where monitoring stations are located.

Several of the pollutants included in the AQI come primarily from automobiles, domestic fuel consumption or long range transport, none of which can be subject to immediate control. In general, therefore, the AQI cannot be used as a tool for the immediate prevention of air pollution.

However, on occasions when the Ministry predicts air quality problems might occur, the AQI system may be used to advise owners of sources which are major contributors to the problem.

4.0 API and AQI Levels and Control Actions

4.1 API

Reading Below 32

Interpretation	Acceptable Level
Control Action	No action necessary

Reading 32 plus; adverse meteorological conditions expected for at least six hours

Interpretation	Air Pollution Advisory Level
Control Action	Minister may advise significant sources of pollution to prepare for curtailment of operations

Reading 50 plus; adverse meteorological conditions forecast for at least six hours

Interpretation	First Air Pollution Alert

Control Action	The Minister, after consulting with the Minister of Health, may order significant sources to curtail operations

Reading 75 plus; adverse meteorological conditions forecast for at least six hours

Interpretation	Second Air Pollution Alert
Control Action	The Minister, after consulting with the Minister of Health, may order further curtailment of pollution sources

Reading 100 plus

Interpretation	Air Pollution Episode Level
Control Action	The Ministry will order all pollution sources not essential to public health or safety to close down

4.2 AQI

Reading	Interpretation
0 - 15	Very Good
16 - 31	Good
32 - 49	Moderate
50 - 99	Poor
100 plus	Very Poor

4.3 Control Actions

On those occasions when the AQI is 32 or higher, and meteorological forecasts indicate that the Index will remain elevated for a prolonged period due to emissions from certain stationary sources, the Ministry may request owners of these sources to take action to alleviate the problem.
The Ministry will make such requests on the basis that the pollutant that is causing the Index to reach 32 or higher is being emitted at concentrations which exceed the Ontario standard or criterion for that pollutant.

In addition to these public information measures and control actions, the Ministry, in conjunction with Environment Canada, has developed a special Air Quality Advisory Program which will inform Ontario residents when concentrations of ground level ozone and related pollutants are expected to reach unacceptable levels. The Ministry will issue Air Quality Advisories from the end of April through to mid-September when widespread, elevated concentrations of ground level ozone in excess of 80 ppb are expected, based on current and forecast information from the provincial Air Quality Index program.

Advisories will include an Action Statement informing the public what they can do to help, an Environmental Statement describing the effects of air pollution on the environment, and a Health Statement regarding the general impacts of air pollution on health.

5.0 Method and Frequency of API and AQI Reports to the Public

5.1 API

The API will be reported to the public when it is the basis of the AQI, and it will be reported as such (see 2.0, Definition of Air Quality Index).

5.2 AQI

Index readings will be reported to appropriate media outlets, eight times a day. Whenever the AQI is reported to be 32 or higher, subsequent reports will be released every hour together with information respecting the probable duration of the 32-or-higher level and the pollutant(s) on which the AQI is based.

GUIDELINE A-6

Determination of Thermal Processes Allowed Under Regulation 555/92 Incineration Ban

Legislative Authority:
Environmental Protection Act
Ontario Regulation 555/92

Responsible Director:
Director, Science and Technology Branch

Last Revision Date:
April, 1994

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SYNOPSIS

A thermal process is any process that utilizes heat to accomplish a physical and/or chemical change in the waste material.

A thermal process involving municipal waste is prohibited if:

1. the weight of all products which will be recycled or reused is less than 50 per cent of the dry weight of waste feed to the thermal process (fuel and material for processing into fuel are not considered recycling products);

   or

2. the process produces a residue (solids collected from the process at any stage, such as ashes) for disposal, which is a leachate toxic waste, as defined in Regulation 347, and which weighs three per cent or more of the dry weight of the waste fed into the process.

In determining whether or not a thermal process is an incineration process, **only** the actual **waste** fed **into**, and products, fuels and residues which come **out of** the thermal processing unit will be considered. If there are products or waste materials from a prior recycling operation, those products or materials cannot be included in the evaluation of the thermal process.

By-product fuels, in gaseous, liquid, or solid forms can be produced in some thermal processes. These fuels are not to be considered a part of the recycled stream in the thermal process addressed in the first criterion.

In the second criterion, residue includes non-reusable materials such as those that are landfilled, or that are non-marketable. Residue is not limited to these materials.

1.0 Purpose

The purpose of this document is to provide the evaluation criteria used for the classification of technologies as incineration or non-incineration and to assist proponents as well as staff of the ministry in determining whether a proposed thermal process is subject to the ban on municipal waste incinerators.

The Ministry of Environment and Energy (MOEE) has banned the construction of future municipal waste (MW) incineration facilities (Regulation 555/92 can be found in Procedure A-6-1 Appendix A). For the purpose of the ban, municipal waste is defined as all wastes covered by Ontario Regulation 347 (formerly O.Reg 309) with the exception of hazardous,

liquid industrial and gaseous wastes. This means that non-hazardous solid industrial wastes are included in the ban along with commercial wastes.

The ministry adopted this ban because incineration competes with waste reduction efforts, produces potentially harmful air emissions and transfers the impact of pollutants from one medium to another. The ministry continues to receive applications and inquiries regarding processes that involve incineration or heat processing such as ones for foundry sand reclamation, for the cleanup of gasoline-contaminated soil and for tire pyrolysis where thermal processing is claimed to be part of a waste reduction, reuse or recycling activity. (Pyrolysis involves heating up a waste material with minimal or no air present, so that the organic part of the waste material is turned into gases.)

A thermal process which utilizes municipal waste must be classified either as an **incineration** or as a **non-incineration** process. A proponent - that is, the person making the proposal - is expected to carry out this classification in consultation with staff of the ministry.

Incineration of municipal wastes for the purpose of disposal and/or energy production is subject to the ban. Therefore, the purpose of the proposed thermal process is the basis for determining whether or not the proposal is subject to the ban. Evaluation of the purpose of the thermal process is done by ministry staff.

Traditional descriptions of the three main types of thermal processes - mass burn, pyrolysis and destructive distillation - can be found in Procedure A-6-1 (Appendix B).

2.0 Background

In April 1991, the government banned all future municipal waste incinerators in Ontario. This policy position was based on three principles:

1) Promotion of the conserver society

   Incineration of municipal waste is counter to the government's principle of promoting a conserver society by supporting reduction, reuse and recycling efforts with an emphasis on the reduction of the amount of waste. If incineration facilities are readily available, then efforts to find new ways to reduce the generation of waste will be discouraged. Furthermore, manufacturers will be less inclined to ensure that their products are recyclable. As well, incinerators often compete directly for waste products that can be reused and recycled. The ban ensures this competition does not occur. The implementation of a comprehensive 3Rs program means that much of the waste that traditionally would have fuelled incinerators will be reused, recycled or composted or will not be generated in the first place.

   The ban on future municipal waste incinerators reinforces the principle that reuse, recycling, composting and source reduction must be priorities.

2) Consideration of multi-media effects

Incineration, in which a solid waste is converted into a gaseous waste for release into the environment, would conflict with the principle that wastes should not be transferred from one medium to another (for example, from land to air) as a means of disposal of the waste.

3) Pollution prevention

Incineration runs counter to the ministry's principle of pollution prevention since incinerators release contaminants into the air and may generate fly ash which is leachate toxic - that is, fly ash which would produce leachate with concentrations of chemicals exceeding the limits set out in Reg. 347.

3.0 Exemptions from the Ban

The amending regulation (555/92) allows incineration of waste wood without preservatives, municipal sewage sludge, as well as pulp and paper mill sludges, including deinking sludges. Animal carcasses which are not classified as pathological waste and small quantity exempted wastes (under Reg. 347, para 1.27, sections xvi to xxi) also can be incinerated. Although incineration of these wastes is permissible, the ministry always will insist that as much waste as possible be diverted from disposal through 3Rs activities.

4.0 Evaluation Criteria

A thermal process is any process that utilizes heat to accomplish a physical and/or chemical change in the waste material.

A thermal process involving municipal waste is prohibited if:

a) **the weight of all products which will be recycled or reused is less than 50 per cent of the dry weight of the waste feed to the thermal process (fuel and material for processing into fuel are not considered recycling products);**

OR

b) **the process produces a residue (solids collected from the process at any stage, such as ashes) for disposal, which is a leachate toxic waste, as defined in Regulation 347, and which weighs three per cent or more of the dry weight of the waste fed into the process.**

In determining whether or not a thermal process is an incineration process, **only** the actual **waste** fed **into**, and **products, fuels and residues** which come **out of** the thermal processing unit will be considered. If there are products or waste materials from a prior recycling operation, those products or materials cannot be included in the evaluation of the thermal process. If non-waste materials are added to the waste materials which are fed to the thermal processing unit, then only the waste materials can be considered in the evaluation of the thermal process.

Byproduct fuels, in gaseous, liquid, or solid forms, can be produced in some thermal processes. These fuels are not to be considered a part of the recycled stream in the thermal process addressed in the first criterion.

The 50 per cent cutoff level was selected as indicative of incineration as any thermal process having more fuel and/or waste product than this level is considered to be primarily for disposal/energy production (as opposed to recycling). Such a process would be subject to the ban.

In the second criterion, residue includes non-reusable materials such as those that are landfilled, or that are non-marketable. Residue is not limited to these materials.

Some municipal waste, such as domestic waste, when incinerated, produces fly ash which is usually leachate toxic. The fly ash in conventional incineration processes usually represents three per cent of the weight of the waste fed into incineration process. Consequently, three per cent is the criterion limit.

5.0 Generic Evaluation Examples

Various forms have been prepared as guidance to the type of information required for an evaluation of a thermal process.

The process evaluation summary form and mass balance form (Procedure A-6-1, Appendix C) address technical evaluation criteria.

Generic examples of completed process evaluation summary forms are included in Procedure A-6-1 (Appendix D).

Examples 1 and 8 describe facilities where waste is used to fuel a kiln process with ash being incorporated into the kiln product.

In example 2, cases 1 and 2 show how a similar process with different levels of recycling would be classed alternately as incineration or recycling.

The third example is a gasification application while example 4 shows how an integrated recycling/incineration plant is handled.

Example 5 is a foundry sand application, example 6 is soil cleaning and example 7 is for thermal processing of car shredder fluff.

Example 9 is a metals recovery process where hazardous fly ash is produced.

The data are for illustrative purposes only and although the mass balance data are typical, data from a proponent may vary, depending on the specific project.

6.0 Information Required for Process Evaluation

Prior to the construction of a new thermal facility, the proponent must obtain a Certificate of Approval (C of A) under Section 9 of the *Environmental Protection Act* (*EPA*) for a discharge of contaminants to the natural environment. Part V approval (waste disposal site), for general waste processing and/or disposal, and other MOEE approvals may be necessary.

It is strongly recommended that, at an early stage and prior to formally applying for a C of A, the proponent contact the Approvals Branch for a pre-submission consultation. The Approvals Branch will then coordinate the participation of regional/district offices and other ministry branches as required.

During the pre-submission consultation the ministry will require the following documentation signed by an authorized representative of the proponent:

1) A mass balance form with documentation to substantiate the figures used (see Procedure A-6-1, Appendix C, for the mass balance form and the process evaluation summary form);

2) Recycled product chemical analysis and/or byproduct specification with a market specification for comparison;

3) Letter(s) of intent from proposed customers of recycled materials.

The proponent should not submit an application for a C of A until after staff of the ministry have indicated that the proposed thermal process is not subject to the incinerator ban.

When a thermal process is not subject to the incineration ban, a formal application for approval (Section 9 and Part V of *EPA*) must include all necessary information required on the application form and in the two guides for applying for a C of A listed in Procedure A-6-1 (Appendix E).

7.0 Criteria Compliance Monitoring

Monitoring of compliance with the criteria will commence after the commissioning period.

It is recognized that seasonal variations will occur in waste feed quantities/qualities and markets for the sale or reuse of recyclable material. Consequently, a 12-month average, calculated each month to include the previous 11 months, will be used to determine compliance with criteria 1 and 2.

The proponent shall maintain records for two years of all calculations used to show compliance with the criteria. Calculations are to be based only upon total quantities of waste received versus total quantity of recyclable material sold or reused (dry basis). Records are to be made available to the ministry on request.

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PROCEDURE A-6-1
APPENDIX A

ONTARIO REGULATION 555/92

PROCEDURE A-6-1
APPENDIX B

DESCRIPTION OF UNITS

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1.0 MASS BURN INCINERATION

2.0 PYROLYSIS UNITS

3.0 DESTRUCTIVE DISTILLATION

DESCRIPTION OF UNITS

1.0 Mass Burn Incineration

There are two kinds of mass burn units in general use: excess air and starved air.

Excess air units normally have only one chamber and generally have a grate system that permits ash movement through the incinerator on a continuous basis. This grate system nearly always has provision to allow underfire air - that is, air fed into the process under the grate - to ensure good burnout of the ash. Residues of less than one per cent carbon are possible with some units. In addition to the underfire air, the units also have provision to regulate quantities of overfire air (air fed into the thermal process above the grate) in order to ensure complete combustion of any volatile gases released from the grate zone. Normally an excess air unit will use two to 2.5 times the minimum amount of air required for complete burning of the waste.

Starved air units generally have two chambers: a primary chamber where the waste is partially burned (using approximately 60 per cent of the minimum amount of air required for complete burning) in order to provide the heat to evaporate the remaining organic matter; extra air is added to a secondary chamber to burn the gases liberated in the first chamber. The primary chamber also normally has a system to move the ash continuously through the chamber but sometimes it does not have provision for adding underfire air. There is residual carbon in the ash which weighs from about 10 to 20 per cent of the weight of the original dry waste feed. Total air usage is generally less than twice the minimum amount of air required for complete burning of the waste. Most of the air is added in the secondary chamber.

1.0 Pyrolysis Units

Heating organics in the absence of air or with a restricted air or oxygen supply results in the organics being turned into gases. Pyrolysis products differ with the temperature of the process. Metallurgical coke, for example, is made at a high temperature and produces mostly gas; low-temperature coke produces more liquids. If all glass, metals, stones, etc., have been removed, the pyrolysis residue of wood or garbage can be a char of chemical composition similar to anthracite coal and with a similar heating value. It can be used as a fuel, as a sterile filter medium or as a soil conditioner.

Pyrolysis units can be heated either externally or internally - in the latter case by burning a small part of the organic material or in both cases by burning a portion of the gases or oils produced by the process. The capital cost of pyrolysis may be less than that for incineration but the volume reduction is smaller.

Pyrolysis units come in many different forms. Generally provision is made to add heat to drive off gases from the waste while an attempt is made to reduce the entrance of air (oxygen). For example, wastes are crushed by the hydraulic feed system to reduce empty space prior to entry into the unit or are processed in gaseous nitrogen. Gases are condensed or compressed with some of the flammable ones being used in externally heated retorts to provide more heat to the unit. The amount of heat needed for pyrolysis is some 4000 megajoules per tonne of refuse or about half the weight of the refuse. The char is very high in carbon and may contain polycyclic aromatic

hydrocarbons (PAHs) if the temperature achieved was not high enough to remove them.

3.0 Destructive Distillation

Destructive distillation is a process which occurs in the absence of oxygen or air. It is a chemical decomposition process which requires heat but does not burn the material.

Waste is placed in a closed, air-free container which then has indirect heat applied. Large organic molecules break down into smaller organic molecules and a carbon char residue. The smaller molecules can be sent to a secondary chamber where they are burned.

PROCEDURE A-6-1
APPENDIX C

PROCESS EVALUATION SUMMARY FORM
AND
MASS BALANCE FORM

PROCESS EVALUATION SUMMARY FORM

The following process data come from the attached mass balance form (Note: Weights in Nos. 4 to 7 are on a dry basis):

1.	Weight of material defined by the MOEE as waste fed into the thermal processor	**W**
2.	Per cent moisture in waste (air dried at 60°C)	**M**
3.	Weight of dry waste fed into the thermal process **A = W - (W*M/100)**	**A**
4.	Weight of gaseous products for recycling	**B**
5.	Weight of liquid products for recycling	**C**
6.	Weight of solid products for recycling	**D**
7.	Weight of hazardous residue for disposal	**E**

The equations in the table below evaluate the proposed thermal process against the criteria outlined in the guidance document Determination of Thermal Processes Allowed Under Regulation 555/92 Incineration Ban.

Criterion No.	Criterion equations	Calculated value
1.	**(B + C + D) / A**	
2.	**E * 100 / A**	

PROCESS WILL BE CONSIDERED TO BE AN INCINERATION PROCESS IF:

CRITERION NO. 1. **(B + C + D) / A** < 0.5

OR

CRITERION NO. 2. **E** * 100 / **A** ≥ 3

Dated .....

Name. Title. Signature.

....

1. Weight of material defined by MOEE as waste fed into the thermal processor.(W)
   Waste quantity actually fed to the unit as opposed to the quantity received at the facility. The waste will generally contain some percentage of moisture.

2. Per cent moisture in waste (air dried at 60°C). (M)
   Determining the amount of moisture in a given material is usually done at 60°C, 105°C or some other higher temperature depending upon the industrial methods involved. However, as temperatures are increased, more types of volatiles are driven off. Some industrial methods also may include the use of vacuum and inert gases. The inert gas method also will be acceptable to the ministry if safety considerations demand it (e.g. gasoline-contaminated soil).

3. Weight of dry waste fed into the thermal process. (A)
   Weight calculated as though no water were present.

4.5.6. Gaseous, liquid or solid products for recycling. (B,C,D)
   Those materials that will be reused or sold by the proponent for some purpose which does not include use as a fuel (e.g. oils could be rerefined for lubricating purposes but not for gasoline).

7. Weight of hazardous residue for disposal. (E)
   Waste can be hazardous due to ignitability, corrosiveness, reactivity, toxicity, radioactivity, infectiousness or leachate toxicity. Ontario Regulation 347, Schedule 3, deals with severely toxic contaminants and Schedule 4 with leachable toxic contaminants which are the main concern with combustion residues.

MASS BALANCE FORM

Appendix to the Process Evaluation Summary Form for the purpose of determining whether or not a process is subject to the ban on future municipal waste incinerators.

The tables below are examples only and must be modified/expanded as necessary.
Only waste, fuel and air will be considered for process evaluation/classification purposes. If other materials are fed into the process, they must be excluded on the mass balance tables.

This rough mass balance form is used only for classification of the proposed process. Complete heat and mass balance calculations will be required for verification of design process data when the formal application for a certificate of approval is submitted.

IN (ALL STREAMS)

FEED INTO THE PROCESS	UNITS (KILOGRAMS PER HOUR)
WASTE FEED AS FIRED[1]	**W =**
AUXILIARY FUEL FEED (IF ANY)	
AIR FEED (IF ANY)	
TOTAL MATERIALS IN	

---

[1] **Weight of dry waste feed into the process (A) and per cent moisture in waste feed (M) are required in the process evaluation form.** Weight of dry waste feed must be calculated from the waste feed as fired in accordance with the following formula:

A = W - (W*M/100),

where W = waste feed as fired and M = per cent moisture by weight in waste feed as fired (air dried at 60°C).

A =	**M =**

OUT (ALL STREAMS)

Note: Moisture is distributed among all the outgoing streams: gases, liquids as well as solids. However, it may be easier to report moisture separately as in the table below, since heat and mass balance calculations will provide the requested numbers. All weights in the tables for gaseous, liquid and solid materials must be reported on a dry basis.

MOISTURE OUT	UNITS (KILOGRAMS PER HOUR)
MOISTURE IN AIR[2]	
MOISTURE IN WASTE[3]	
MOISTURE FORMED (if any)[4]	
TOTAL MOISTURE OUT[5]	

---

2 MOISTURE IN AIR means the moisture which was contained in the air feed (MIA) into the process and is calculated in accordance with the following formula:

MIA = PMA/100*WA

where PMA = per cent moisture by weight in the air feed into the process and WA = weight of air feed into the process.

3 MOISTURE IN WASTE means moisture which was contained in the waste feed (MIW) as fired and is calculated in accordance with the following formula:

MIW = M/100*W,

where M = per cent moisture by weight in waste feed as fired and W = weight of waste feed as fired.

4 MOISTURE FORMED means moisture which may be formed during complete or partial oxidation of waste, auxiliary fuel and any byproduct fuel generated in the process. In some processes no moisture may be formed.

5 TOTAL MOISTURE OUT means the moisture which is distributed among all outgoing gaseous, liquid and solid streams.

OUT (ALL STREAMS) - continued

GASEOUS MATERIALS OUT	UNITS (KILOGRAMS PER HOUR)
STACK GAS OXYGEN[6]	
STACK GAS NITROGEN[7]	
STACK GAS BYPRODUCTS[8]	
GASEOUS BYPRODUCTS FOR USE AS FUEL (in-plant or sale, specify)	
GASEOUS PRODUCTS FOR RECYCLING[9] (specify)	**B** =
TOTAL GASEOUS MATERIALS OUT (on dry basis)	

LIQUID MATERIALS OUT	UNITS (KILOGRAMS PER HOUR)
LIQUID BYPRODUCTS TO BE DISPOSED OF (specify)	
LIQUID BYPRODUCTS FOR USE AS FUEL (in-plant/sale, specify)	
LIQUID PRODUCTS FOR RECYCLING[10] (specify)	**C** =
TOTAL LIQUID MATERIALS OUT (on dry basis)	

---

6 STACK GAS OXYGEN means the oxygen which is contained in the air feed into the process but which is not consumed in the process, and is discharged into the natural environment as part of the stack gases. Oxygen is reported separately, since the amount is easily obtained from heat and mass balance calculations.

7 STACK GAS NITROGEN means the nitrogen which is contained in the air feed into the process but which is not consumed in the process and is discharged into the natural environment as part of the stack gases. Nitrogen is reported separately, since the amount is easily obtained from heat and mass balance calculations.

8 STACK GAS BYPRODUCTS include products of complete or incomplete combustion, such as carbon dioxide, carbon monoxide etc., which are discharged into the natural environment as part of the stack gases.

9 GASEOUS PRODUCTS FOR RECYCLING mean those gaseous products that are not discharged as part of stack gases, but are collected to be used directly as products other than fuel or are used as feedstock into a process which generates products other than fuel; all products for recycling must be non-fuel products.

10 LIQUID PRODUCTS FOR RECYCLING mean those liquid products that are collected and used directly as products other than fuel or are used as feedstock into a process which generates products other than fuel; all products for recycling must be non-fuel products.

OUT (ALL STREAMS) - continued

SOLIDS MATERIALS OUT	UNITS (KILOGRAMS PER HOUR)
SOLID BYPRODUCTS FOR USE AS FUEL (in-plant/sale, specify)	
NON-HAZARDOUS RESIDUE (bottom ash and any other ashes and residues) FOR DISPOSAL	
SOLID PRODUCTS FOR RECYCLING[11] (specify)	**D** =
HAZARDOUS RESIDUE (O.REG. 347, Schedules 3 or 4) FOR DISPOSAL	**E** =
TOTAL SOLID MATERIALS OUT (on dry basis)	

TOTAL MATERIALS OUT	

The process evaluation summary form does not require all the process data which are included in the mass balance tables. The purpose of the mass balance tables is to provide self-auditing worksheets for the weights reported on the process evaluation summary form, since total materials in must equal total materials out.

[11] SOLID PRODUCTS FOR RECYCLING mean those solid products that are collected and used directly as products other than fuel or are used as feedstock into a process which generates products other than fuel; all products for recycling must be non-fuel products.

PROCEDURE A-6-1
APPENDIX D

TYPICAL EXAMPLES OF PROCESS EVALUATION SUMMARY FORM.

Example #1

A company wishes to use pyrolysis (heating a waste with little or no air present) on a mixture of municipal waste (MW) (23,000Kg/hr) and clay (38,000Kg/hr) to form a lightweight aggregate. The combustible gases produced from the organic portion of the municipal waste will be burned for process heat with the excess being used for electricity generation. Ash residue (of which the weight is 20 per cent of the MW weight or 3,800Kg/hr) is incorporated into the aggregate as a beneficial material. Other than the clay, all materials used are waste materials that are now generally landfilled. The aggregate product passes the O.Reg 347 Leachate Extraction Procedure but it is assumed that the fly ash (45Kg/hr) does not.

No allowance should be made in the mass balance for the weight of clay used.

The mass balance calculation shows a loss in the weight of the waste of 80 per cent due to burning as fuel. The weight of the residue which will require disposal in a hazardous waste landfill is less than one per cent of the original weight of the waste.

Criterion 1	
Weight of material used as fuel	80%
Weight of material disposed of as waste	<1%
Weight of material recycled or reused	20%

Criterion 2	
Weight of residue defined as hazardous waste (schedule 3,4)	< 1%

Decision: Incineration. Fails criterion 1 evaluation condition as total weight of materials for recycling is less than 50 per cent of the total weight of the dry material fed into the thermal process.

PROCESS EVALUATION SUMMARY FORM

The following process data come from the attached mass balance form (NOTE: Weights in Nos. 4 to 7 are on a dry basis):

1.	Weight of material defined by the MOEE as waste fed into the thermal processor	**W** 23,000
2.	Per cent moisture in waste (air dried at 60°C)	**M** 17.4%
3.	Weight of dry waste fed into the thermal process **A = W - (W*M/100)**	**A** 19,000
4.	Weight of gaseous products for recycling	**B** 0
5.	Weight of liquid products for recycling	**C** 0
6.	Weight of solid products for recycling	**D** 3,800
7.	Weight of hazardous residue for disposal	**E** 45

The equations in the table below evaluate the proposed thermal process against the criteria outlined in the guidance document Determination of Thermal Processes Allowed Under Regulation 555/92 Incineration Ban.

Criterion No.	CRITERIA EQUATIONS	CALCULATED VALUE
1.	**(B + C + D) / A**	3,800/19,000 = 0.2
2.	**E * 100 / A**	45 x 100/19,000 = 0.24

PROCESS WILL BE CONSIDERED TO BE AN INCINERATION PROCESS IF:

CRITERION NO. 1. **(B + C + D) / A** < 0.5 OR

CRITERION NO. 2. **E** * 100 / **A** ≥ 3

Dated .....

Name. ..... Title. ..... Signature. .....

Example #2 Case 1

A company has done feasibility studies on the pyrolysis of tires using a bench scale unit of an innovative design. Tires are transformed into primary products including steel, fine carbon black, and gases which can be condensed for recycling as chemical feedstocks such as butadiene, simple terpenes and monocyclic aromatics such as benzene and styrene.

In a commercial unit (14,000Kg/hr with four per cent moisture content), non-condensable gases and liquid fuel at 19 per cent (2,500Kg/hr) of the original dry weight of the tires fed to the process would be used as a fuel heat source for the pyrolysis unit or sent to a fuel user.

The non-marketable carbon black yield would weigh 36 per cent (4,900Kg/hr) of the original dry weight of the tires, recyclable steel would be three per cent (400Kg/hr) of the original dry weight and recyclable liquids would make up the difference at 42 per cent (5,600Kg/hr). This liquid is said to consist almost entirely of hydrocarbons and could be rerefined into a non-fuel product. The carbon black is not leachate toxic.

Criterion 1

Weight of material used as fuel (gas and oil)	19%
Weight of material disposed of as waste	36%
Weight of material recycled or reused	45%

Criterion 2

Weight of residue defined as hazardous waste (schedule 3,4)	0%

Decision: Incineration. Fails criterion 1 evaluation condition as total weight of materials to be recycled is less than 50 per cent of the total dry weight of the tires.

PROCESS EVALUATION SUMMARY FORM

The following process data come from the attached mass balance form (NOTE: Weights in Nos. 4 to 7 are on a dry basis):

1.	Weight of material defined by the MOEE as waste fed into the thermal processor	**W** 14,000
2.	Per cent moisture in waste (air dried at 60°C)	**M** 4%
3.	Weight of dry waste fed into the thermal process **A = W - (W*M/100)**	**A** 13,440
4.	Weight of gaseous products for recycling	**B** 0
5.	Weight of liquid products for recycling	**C** 5,600
6.	Weight of solid products for recycling	**D** 400
7.	Weight of hazardous residue for disposal	**E** 0

The equations in the table below evaluate the proposed thermal process against the criteria outlined in the guidance document Determination of Thermal Processes Allowed Under Regulation 555/92 Incineration Ban.

Criterion No.	CRITERIA EQUATIONS	CALCULATED VALUE
1.	**(B + C + D) / A**	(5600+400)/13440 = 0.45
2.	**E * 100 / A**	0

PROCESS WILL BE CONSIDERED TO BE AN INCINERATION PROCESS IF:

CRITERION NO. 1. **(B + C + D) / A** < 0.5

OR

CRITERION NO. 2. **E** * 100 / **A** ≥ 3

Dated .....

Name. Title. Signature.

....

Example #2 Case 2

The company described in Case 1 now has improved the efficiency of their process for the pyrolysis of tires using the same bench scale unit with some modifications. Tires are still transformed into primary products including steel, fine carbon black, and gases which can be condensed for recycling such as butadiene, simple terpenes and monocyclic aromatics such as benzene and styrene.

In a commercial unit, non-condensable gases and liquid fuel, now at 14 per cent (2,000Kg/hr) of the original dry weight of the tires fed to the process, would be used as the heat source for the pyrolysis unit or sent to a fuel user.

The non-marketable carbon black yield is now 32 per cent (4,500Kg/hr) of the dry weight of the tires, recyclable steel remains the same, weighing three per cent of the dry weight of the tires, and recyclable liquids make up the difference at 49 per cent (6,900Kg/hr) of the original dry weight. This liquid is said to consist almost entirely of hydrocarbons and will be rerefined into a non-fuel product.

Criterion 1	
Weight of material used as fuel (gas and oil)	14%
Weight of material disposed of as waste	32%
Weight of material recycled or reused	54%
Criterion 2	
Weight of residue defined as hazardous waste (schedule 3,4)	0%

Decision: Case 2 Non-Incineration. Passes criteria 1 and 2 as the total weight of the material to be recycled is greater than 50 per cent of the total dry weight of the tires and the weight of the hazardous waste is less than three per cent of the original dry weight.

PROCESS EVALUATION SUMMARY FORM

The following process data come from the attached mass balance form (NOTE: Weights in Nos. 4 to 7 are on a dry basis):

1.	Weight of material defined by the MOEE as waste fed into the thermal processor	**W** 14,000
2.	Per cent moisture in waste (air dried at 60°C)	**M** 4%
3.	Weight of dry waste fed into the thermal process **A = W - (W*M/100)**	**A** 13,400
4.	Weight of gaseous products for recycling	**B** 0
5.	Weight of liquid products for recycling	**C** 6,900
6.	Weight of solid products for recycling	**D** 400
7.	Weight of hazardous residue for disposal	**E** 0

The equations in the table below evaluate the proposed thermal process against the criteria outlined in the guidance document Determination of Thermal Processes Allowed Under Regulation 555/92 Incineration Ban.

Criterion No.	CRITERIA EQUATIONS	CALCULATED VALUE
1.	**(B + C + D) / A**	(6900+400)/13400 = 0.54
2.	**E * 100 / A**	0

PROCESS WILL BE CONSIDERED TO BE AN INCINERATION PROCESS IF:

CRITERION NO. 1. **(B + C + D) / A** < 0.5

OR

CRITERION NO. 2. **E** * 100 / **A** ≥ 3

Dated .....

Name. Title. Signature.

....

Example #3

A company has developed plasma technology for the gasification of municipal wastes or other organic wastes. Although the pilot plant unit uses electricity, a full scale unit (15,000Kg/hr) could produce substantially more electricity through burning a gas byproduct than required for the plant, therefore becoming a non utility generator.

When municipal waste with 25 per cent moisture content is treated, it produces 7,800Kg/hr of byproduct gas (70 per cent of the weight of the waste fed into the plasma thermal process on a dry basis). This is then burned to produce electricity. In addition 3,400Kg/hr of residue (30 per cent of the weight of the dry waste fed into the plasma process) is also produced by the plasma process. This residue is a virtually inert glass-like substance of probable commercial value. There is no leachate toxic fly ash produced.

Criterion 1	
Weight of material used as fuel	70%
Weight of material disposed of as waste	0%
Weight of material recycled or reused	30%
Criterion 2	
Weight of residue defined as hazardous waste (schedule 3,4)	0%

Decision: Incineration. Fails criterion 1 evaluation condition as total weight of materials to be recycled is less than 50 per cent of the total dry weight of the waste fed into the thermal process.

PROCESS EVALUATION SUMMARY FORM

The following process data come from the attached mass balance form (NOTE: Weights in Nos. 4 to 7 are on a dry basis):

1.	Weight of material defined by the MOEE as waste fed into the thermal processor	**W** 15,000
2.	Per cent moisture in waste (air dried at 60°C)	**M** 25
3.	Weight of dry waste fed into the thermal process **A = W - (W*M/100)**	**A** 11,200
4.	Weight of gaseous products for recycling	**B** 0
5.	Weight of liquid products for recycling	**C** 0
6.	Weight of solid products for recycling	**D** 3,400
7.	Weight of hazardous residue for disposal	**E** 0

The equations in the table below evaluate the proposed thermal process against the criteria outlined in the guidance document Determination of Thermal Processes Allowed Under Regulation 555/92 Incineration Ban.

Criterion No.	CRITERIA EQUATIONS	CALCULATED VALUE
1.	**(B + C + D) / A**	3,400/11,200 = 0.3
2.	**E * 100 / A**	0

PROCESS WILL BE CONSIDERED TO BE AN INCINERATION PROCESS IF:

CRITERION NO. 1. **(B + C + D) / A** < 0.5

OR

CRITERION NO. 2. **E** * 100 / **A** ≥ 3

Dated .....

Name. Title. Signature.

....

Example #4
A municipality proposes building a 25,000Kg/hr fully integrated, waste management facility which includes recycling, composting and an energy-from-waste plant. The latter will burn only the recycling plant's waste that has no market (20 per cent of total amount of waste coming into the integrated plant) in order to reduce the demand on the municipality's shrinking landfill capacity. This waste has a 25 per cent moisture content. The integrated plant also will send 13 per cent of the maximum amount of incoming waste to landfill as being neither recyclable nor burnable.

For the energy-from-waste plant the feed rate is therefore 5,000Kg/hr. Hazardous fly ash weighs about three per cent (115Kg/hr) of the total weight of the dry feed and bottom ash weighs 27 per cent of the dry feed to the EFW plant. The remainder, 70 per cent, becomes combustion gases from producing the energy which will be used in the composting and recycling processes. Without the EFW portion of the project, the vendor is not able to guarantee costs and the municipality will not proceed with the project.

The following summary allows comparison of the complete plant with just the EFW portion. The integrated plant figures are calculated by combining the weights of materials from both the recycling and the EFW sections of the plant. The weight of the material disposed of includes 13 per cent recycling waste and the fly/bottom ash.

The incineration evaluation relates only to the EFW portion of the plant, which is the thermal process at the facility.

	Integrated Plant	EFW Plant
Criterion 1		
Weight of material used as fuel	15%	70%
Weight of material disposed of as waste	18%	30%
Weight of material recycled or reused	67%	0%
Criterion 2		
Weight of residue defined as hazardous waste (schedule 3,4)	<1%	3%

Decision: Incineration. Fails criterion 1 as the weight of the EFW fuel portion is greater than 50 per cent of the total dry weight of the material fed into the EFW, and less than 50 per cent of the feed to the thermal process is recycled. Also fails criterion 2 as the weight of the hazardous waste is greater than three per cent of the dry weight of the feed into the thermal process.

PROCESS EVALUATION SUMMARY FORM

The following process data come from the attached mass balance form (NOTE: Weights in Nos. 4 to 7 are on a dry basis):

1.	Weight of material defined by the MOEE as waste fed into the thermal processor	**W**	5,000
2.	Per cent moisture in waste (air dried at 60°C)	**M**	25%
3.	Weight of dry waste fed into the thermal process **A = W - (W*M/100)**	**A**	3,750
4.	Weight of gaseous products for recycling	**B**	0
5.	Weight of liquid products for recycling	**C**	0
6.	Weight of solid products for recycling	**D**	0
7.	Weight of hazardous residue for disposal	**E**	115

The equations in the table below evaluate the proposed thermal process against the criteria outlined in the guidance document Determination of Thermal Processes Allowed Under Regulation 555/92 Incineration Ban.

Criterion No.	CRITERIA EQUATIONS	CALCULATED VALUE
1.	**(B + C + D) / A**	0/3,750 = 0.0
2.	**E * 100 / A**	115 x 100/3,750 = 3.0

PROCESS WILL BE CONSIDERED TO BE AN INCINERATION PROCESS IF:

CRITERION NO. 1. **(B + C + D) / A** < 0.5

OR

CRITERION NO. 2. **E** * 100 / **A** ≥ 3

Dated .....

Name. Title. Signature.

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Example #5

A custom casting plant combines a special organic binder with sand to form moulds (three per cent by weight is binder). After multiple uses the sand becomes a waste; however, because of the leachable nature of the binder, the sand/binder mixture cannot be used in construction or as backfill. The sand can be reused after the binder is burned off and the sand rescreened.

The thermal process used for reclaiming the sand for this case is designed to process 8,500Kg/hr of the sand (8,250) and binder (250) mix. Fossil fuel is used in the thermal process to supplement binder heat input but is not considered a waste material so it is not included in the material balance. Rescreening produces on a dry basis, approximately two per cent of the weight of the original dry material as fines (170Kg/hr) and two per cent hazardous metals (170Kgm/hr), both requiring landfill disposal. As a result, 7,900Kg/hr of sand is recovered.

Criterion 1

Weight of material used as fuel	3%
Weight of material disposed of as waste	4%
Weight of material recycled or reused	93%

Criterion 2

Weight of residue defined as hazardous waste (schedule 3,4)	2%

Decision: Non incineration. Passes criteria 1 and 2 as the total weight of the material to be recycled is greater than 50 per cent of the total dry weight of the material fed into the thermal process (waste and fuel portion is seven per cent) and the weight of the hazardous residue is less than three per cent of the weight of the dry feed.

PROCESS EVALUATION SUMMARY FORM

The following process data come from the attached mass balance form (NOTE: Weights in Nos. 4 to 7 are on a dry basis):

1.	Weight of material defined by the MOEE as waste fed into the thermal processor	**W** 8,500
2.	Per cent moisture in waste (air dried at 60°C)	**M** 0%
3.	Weight of dry waste fed into the thermal process **A = W - (W*M/100)**	**A** 8,500
4.	Weight of gaseous products for recycling	**B** 0
5.	Weight of liquid products for recycling	**C** 0
6.	Weight of solid products for recycling	**D** 7,900
7.	Weight of hazardous residue for disposal	**E** 170

The equations in the table below evaluate the proposed thermal process against the criteria outlined in the guidance document Determination of Thermal Processes Allowed Under Regulation 555/92 Incineration Ban.

Criterion No.	CRITERIA EQUATIONS	CALCULATED VALUE
1.	**(B + C + D) / A**	7,900/8,500 = 0.93
2.	**E * 100 / A**	170 x 100/8,500 = 2.0

PROCESS WILL BE CONSIDERED TO BE AN INCINERATION PROCESS IF:

CRITERION NO. 1. **(B + C + D) / A** < 0.5

OR

CRITERION NO. 2. **E** * 100 / **A** ≥ 3

Dated .....

Name. Title. Signature.

....

Example #6

A municipality wishes to redevelop some industrial land it owns for affordable housing after cleaning the soil left from a gasoline/home heating oil storage facility that once occupied the site. Sampling revealed that some of the residues cannot be cleaned through biological processes so it was decided to use low temperature incineration with the soil being returned to the site. The thermal processing unit handles 21,000Kg/hr of material with a 10 per cent moisture content. Spilled gasoline and part of the soil are burned off in the thermal process; the weight of the material burned off amounts to five per cent of the total weight of the soil on a dry basis. There is no hazardous waste produced.

Criterion 1	
Weight of material used as fuel	5%
Weight of material disposed of as waste	0%
Weight of material recycled or reused	95%

Criterion 2	
Weight of residue defined as hazardous waste (schedule 3,4)	0%

Decision: Non incineration. Passes criteria 1 and 2. Can undergo approval process as total weight of material to be recycled is greater than 50 per cent of the total weight of the dry material fed into the thermal process (waste and fuel portion is five per cent) and the weight of the hazardous waste is less than three per cent of the total dry weight.

PROCESS EVALUATION SUMMARY FORM

The following process data comes from the attached mass balance form (NOTE: Weights in Nos. 4 to 7 are on a dry basis):

1.	Weight of material defined by the MOEE as waste fed into the thermal processor	**W** 21,000
2.	Per cent moisture in waste (air dried at 60°C)	**M** 10%
3.	Weight of dry waste fed into the thermal process **A = W - (W*M/100)**	**A** 18,900
4.	Weight of gaseous products for recycling	**B** 0
5.	Weight of liquid products for recycling	**C** 0
6.	Weight of solid products for recycling	**D** 18,000
7.	Weight of hazardous residue for disposal	**E** 0

The equations in the table below evaluate the proposed thermal process against the criteria outlined in the guidance document Determination of Thermal Processes Allowed Under Regulation 555/92 Incineration Ban.

Criterion No.	CRITERIA EQUATIONS	CALCULATED VALUE
1.	**(B + C + D) / A**	18,000/18,900 = 0.95
2.	**E * 100 / A**	0

PROCESS WILL BE CONSIDERED TO BE AN INCINERATION PROCESS IF:

CRITERION NO. 1. **(B + C + D) / A** < 0.5

OR

CRITERION NO. 2. **E** * 100 / **A** ≥ 3

Dated .....

Name. Title. Signature.

....

Example #7

A metals recycling facility operates a high capacity shredding operation using scrap automobiles and white goods as feed material. Metals are recovered with the remaining material (shredder fluff) sent to disposal.

The company proposes to construct a thermal process to recover more metal from the 10,600Kg/hr of fluff by burning off the plastics, etc. Fluff is approximately nine per cent metal (900Kg/hr), 81 per cent burnable material such as plastics and upholstery (8,600Kg/hr), and 10 per cent moisture (1,100Kg/hr). The thermal process produces metals for recycling and a leachate toxic fly ash (400Kg/hr).

Criterion 1	
Weight of material used as fuel	86.3%
Weight of material disposed of as waste	4.2%
Weight of material recycled or reused	9.5%
Criterion 2	
Weight of residue defined as hazardous waste (schedule 3,4)	4.2%

Decision: Incineration. Fails criteria 1 and 2 with the weight of materials for recycling being less than 50 per cent of the total dry weight of the materials fed into the thermal process and the weight of the hazardous residue being greater than three per cent of the total dry weight.

PROCESS EVALUATION SUMMARY FORM

The following process data come from the attached mass balance form (NOTE: Weights in Nos. 4 to 7 are on a dry basis):

1.	Weight of material defined by the MOEE as waste fed into the thermal processor	**W**	10,600
2.	Per cent moisture in waste (air dried at 60°C)	**M**	10
3.	Weight of dry waste fed into the thermal process **A = W - (W*M/100)**	**A**	9,500
4.	Weight of gaseous products for recycling	**B**	0
5.	Weight of liquid products for recycling	**C**	0
6.	Weight of solid products for recycling	**D**	900
7.	Weight of hazardous residue for disposal	**E**	400

The equations in the table below evaluate the proposed thermal process against the criteria outlined in the guidance document Determination of Thermal Processes Allowed Under Regulation 555/92 Incineration Ban.

Criterion No.	CRITERIA EQUATIONS	CALCULATED VALUE
1.	**(B + C + D) / A**	900/9,500 = 0.095
2.	**E * 100 / A**	400 x 100/9,500 = 4.2

PROCESS WILL BE CONSIDERED TO BE AN INCINERATION PROCESS IF:

CRITERION NO. 1. **(B + C + D) / A** < 0.5

OR

CRITERION NO. 2. **E** * 100 / **A** ≥ 3

Dated .....

Name. Title. Signature.

....

Example #8

A cement company wants to use a refuse-derived fuel (21,000Kg/hr) with a 20 per cent moisture content to replace some of the coal used as fuel in their cement kiln. Testing in other jurisdictions indicates that a ratio of 4:1 clay/limestone mixture (as CaO) to dry RDF is the maximum allowable to produce a good product. Bottom ash (at a calculated 4,000Kg/hr or at a weight of 19 per cent of the dry material fed into the thermal process) is incorporated in the cement clinker, while fly ash (calculated at 170kg/hr or one per cent of the dry feed) is incorporated in the kiln dust and is not leachate toxic.

Criterion 1	
Weight of material used as fuel	75%
Weight of material disposed of as waste	1%
Weight of material recycled or reused	24%

Criterion 2	
Weight of residue defined as hazardous waste (schedule 3,4)	0%

Decision: Incineration. Fails criterion 1 as total weight of material to be recycled is less than 50 per cent of the total weight of the dry material fed into the thermal process.

PROCESS EVALUATION SUMMARY FORM

The following process data come from the attached mass balance form (NOTE: Weights in Nos. 4 to 7 are on a dry basis):

1.	Weight of material defined by the MOEE as waste fed into the thermal processor	**W** 21,000
2.	Per cent moisture in waste (air dried at 60°C)	**M** 20%
3.	Weight of dry waste fed into the thermal process **A = W - (W*M/100)**	**A** 16,800
4.	Weight of gaseous products for recycling	**B** 0
5.	Weight of liquid products for recycling	**C** 0
6.	Weight of solid products for recycling	**D** 4,000
7.	Weight of hazardous residue for disposal	**E** 0

The equations in the table below evaluate the proposed thermal process against the criteria outlined in the guidance document Determination of Thermal Processes Allowed Under Regulation 555/92 Incineration Ban.

Criterion No.	CRITERIA EQUATIONS	CALCULATED VALUE
1.	**(B + C + D) / A**	4000/16800 = 0.24
2.	**E * 100 / A**	0

PROCESS WILL BE CONSIDERED TO BE AN INCINERATION PROCESS IF:

CRITERION NO. 1. **(B + C + D) / A** < 0.5

OR

CRITERION NO. 2. **E** * 100 / **A** ≥ 3

Dated .....

Name. Title. Signature.

....

Example #9

A recycling company plans to use a thermal process to reclaim the metal content contained in a mixed scrap metal which has five per cent cutting and lubricating oils (100kg/hr). There is no moisture content. In the 2,100Kg/hr process, 200Kg/hr lead, 400Kg/hr zinc and 1200Kg/hr iron are recovered. The remainder (200Kg/hr) is a hazardous fly ash which is sent to landfill.

Criterion 1

Weight of material used as fuel	5%
Weight of material disposed of as waste	9%
Weight of material recycled	86%

Criterion 2

Weight of residue defined as hazardous waste	9%

Decision: Incineration - Process passes criterion 1 but fails criterion 2 as the weight of the material designated as hazardous waste is more than three per cent of the total weight of the dry material fed into the thermal process.

PROCESS EVALUATION SUMMARY FORM

The following process data come from the attached mass balance form (NOTE: Weights in Nos. 4 to 7 are on a dry basis):

1.	Weight of material defined by the MOEE as waste fed into the thermal processor	**W** 2,100
2.	Per cent moisture in waste (air dried at 60°C)	**M** 0
3.	Weight of dry waste fed into the thermal process **A = W - (W*M/100)**	**A** 2,100
4.	Weight of gaseous products for recycling	**B** 0
5.	Weight of liquid products for recycling	**C** 0
6.	Weight of solid products for recycling	**D** 1,800
7.	Weight of hazardous residue for disposal	**E** 200

The equations in the table below evaluate the proposed thermal process against the criteria outlined in the guidance document Determination of Thermal Processes Allowed Under Regulation 555/92 Incineration Ban.

Criterion No.	CRITERIA EQUATIONS	CALCULATED VALUE
1.	**(B + C + D) / A**	1800/2100 = 0.86
2.	**E * 100 / A**	200 * 100/2100 = 9

PROCESS WILL BE CONSIDERED TO BE AN INCINERATION PROCESS IF:

CRITERION NO. 1. **(B + C + D) / A** < 0.5

OR

CRITERION NO. 2. **E** * 100 / **A** ≥ 3

Dated .....

Name. Title. Signature.

....

PROCEDURE A-6-1
APPENDIX E

APPROVAL GUIDANCE DOCUMENTS

APPROVAL GUIDANCE DOCUMENTS

The following documents are available from the Approvals Branch to assist applicants for Certificates of Approval. They may be ordered by contacting:

Ontario Ministry of Environment and Energy
Approvals Branch
250 Davisville Ave. (3rd Floor)
Toronto
Ontario M4S 1H2
Attention: Information Officer
Telephone (416) 440-3718

1. GENERAL INFORMATION, CERTIFICATES OF APPROVAL, AIR, Section 9, Environmental Protection Act, R.S.O. 1990, Chapter E-19, Approvals Branch, August 1992.

2. GUIDE FOR APPLYING FOR CERTIFICATES OF APPROVAL, AIR, (SOURCES OF CONTAMINANTS) Section 9, Environmental Protection Act R.S.O. 1990, Chapter E-19, Approvals Branch, September 1992.

3. GUIDE FOR APPLYING FOR CERTIFICATES OF APPROVAL, WASTE DISPOSAL SITES (LANDFILL, TRANSFER OR PROCESSING), Sections 27, 30, 31 and 32, Environmental Protection Act, R.S.O. 1990, Chapter E-19, Approvals Branch, September 1992.

MANUAL OF GUIDELINES AND PROCEDURES

PART B - WATER

December 31, 1994

PART B - WATER

Chapter Contents

B-1 Water Management -- Guidelines and Procedures of the Ministry of Environment and Energy (Guideline Summary)

B-1-1 Water Management -- Policies, Guidelines, Provincial Water Quality Objectives of the Ministry of Environment and Energy (July, 1994)

B-1-2 Revised Tables of Objectives for Ministry of Environment and Energy's Publication "Water Management" **(available from Public Information Centre as PIBS# 3303)**

B-1-3 Protection and Management of Aquatic Sediment Quality in Ontario **(available from PIC as PIBS# 1962)**

B-1-4 Fill Quality Guidelines for Lakefilling in Ontario **(available from PIC as PIBS# 1963)**

B-1-5 Deriving Receiving-Water Based, Point-Source Effluent Requirements for Ontario Waters

B-2 **combined with B-1**

B-3 Resolution of Well Water Quality Problems Resulting from Winter Road Maintenance

B-4 Snow Disposal and De-Icing Operations in Ontario

B-4-1 Snow Disposal and De-icing Operations in Ontario (1975) **(available from PIC as PIBS# 412-01)**

B-5 Drinking Water Quality

B-5-1 Ontario Drinking Water Objectives **(available from PIC as PIBS# 2889)**

B-6 Evaluating Construction Activities -- Gas/Oil Transmission Pipelines Crossing Watercourses

B-6-1 Evaluating Construction Activities Impacting on Water Resources (1994) **(available from PIC as PIBS# 1711-01, 1711-02, 1711-03)**

B-7 Incorporation of The Reasonable Use Concept into MOEE Groundwater Management Activities

B-7-1 Determination of Contaminant Limits and Attenuation Zones

B-8 Evaluating Construction Activities -- Highways and Bridges

B-9 Resolution of Groundwater Interference Problems

B-9-1 Resolution of Groundwater Quality Interference Problems (revised 1993)

B-10 Evaluating Construction Activities - Marine Construction Projects

B-11 Evaluating Construction Activities - Small Scale Construction Projects

B-12 Potable Water Storage Structures

B-13 Treatment Requirements for Municipal and Communal Waterworks Using Surface Water Sources

B-13-1 Granting a Variance from the Treatment Requirements for Municipal and Communal Waterworks using Surface Water Sources

B-13-2 Guide for Applying for Approval of Municipal and Private Water and Sewage Works **(available from PIC as PIBS# 7-02)**

B-13-3 Chlorination of Potable Water Supplies **(available from PIC as PIBS# 7-03)**

B-14 Treatment Requirements for Municipal and Communal Waterworks Using Groundwater Sources

B-14-1 Granting a Variance from the Treatment Requirements for Municipal and Communal Waterworks using Groundwater Sources

B-14-2 Design of Water Supply Systems for Small Residential Developments **(available from PIC as PIBS# 3025-02)**

B-15 Use and Storage of Pesticides at Waterworks

GUIDELINE B-1
(formerly 15-01)

Water Management -- Guidelines and Procedures of the Ministry of Environment and Energy

(under revision)

Legislative Authority:

Ontario Water Resources Act

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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SYNOPSIS

To ensure the effective management of the Province's water resources, the following goals, guidelines and procedures contained in Procedure B-1-1: "Water Management -- Guidelines and Procedures of the Ministry of Environment and Energy" (under revision), and summarized in this guideline shall be adhered to.

1.0 Introduction

To ensure the effective management of the Province's water resources, the following goals and guidelines contained in the publication "Water Management -- Guidelines and Procedures of the Ministry of Environment and Energy" (under revision) shall be adhered to. Reference should be made to that publication (often referred to as the "Blue Book") for additional details on the guidelines, procedures and tables referred to in the following text.

2.0 Surface Water Quality Management

2.1 Goal

To ensure that the surface waters of the province are of a quality which is satisfactory for aquatic life and recreation.

Water which meets the water quality criteria for aquatic life and recreation (designated as the Provincial Water Quality Objectives (PWQO), Table 1 of the "Blue Book", will be suitable for most other beneficial uses, such as drinking water and agriculture. For those parameters where better water quality is required to protect beneficial uses in a given location, the appropriate criteria shall be applied in that location.

2.2 Guidelines

2.2.1 Areas with Water Quality better than the Objectives

In areas which have water quality better than the PWQO water quality shall be maintained at or above the Objectives.

2.2.2 Areas with Water Quality not meeting the Objectives

Water quality which presently does not meet the PWQO shall not be degraded further and all practical measures shall be taken to upgrade the water quality to the Objectives.

2.2.3 Effluent Requirements

Effluent requirements shall be established on a case-by-case basis. In establishing effluent requirements, the characteristics of the receiving water body shall be considered, as shall Federal and Provincial effluent regulations and guidelines where applicable. The effluent requirements so derived shall be incorporated into Certificates of Approval (under the *Ontario Water Resources Act*, Section 53) and shall specify both waste loadings and concentrations.

2.2.4 Hazardous Substances

Special preventive measures are required to deal with the release of known or potentially hazardous substances. Accordingly, the Ministry's guideline is aimed at:

(i) preventing the release of those substances listed in Table 2 of the "Blue Book" which are hazardous if released in any concentration;

(ii) ensuring that special measures are taken on a case-by-case basis to minimize the release of any substance for which a PWQO has not yet been established.

2.2.5 Mixing Zones

A mixing zone is defined as an area of water contiguous to an effluent point source in which the water quality does not comply with the PWQO. Terms and conditions related to a mixing zone shall be designated on a case-by-case basis and may be specified in Certificates of Approval, control orders, requirements and directions, or approvals to proceed under the *Environmental Assessment Act*. The size of the mixing zone shall be minimized to the greatest possible degree and under no circumstances is the mixing zone to be used as an alternative to treatment.

3.0 Surface Water Quantity Management

3.1 Goal

To ensure a fair sharing of the available supply of water to protect both withdrawal and in-place uses of water.

3.2 Guidelines

3.2.1 Water Quality-Quantity Inter-Relationships

The withdrawal of water from and discharge of water to surface water bodies shall be controlled to assist in maintaining or restoring water quality for the protection of aquatic life and recreation.

3.2.2 Permits to take Water

Takers shall control surface water takings to prevent interference with other uses of water wherever possible and to resolve such problems if they do occur.

3.2.3 Surface Water Conservation

All reasonable and practical measures should be taken to conserve the quantity of surface water in order to maximize its availability for existing or potential beneficial uses.

4.0 Groundwater quality management

4.1 Goal

To protect the quality of ground water for the greatest number of beneficial uses.

In the majority of cases, human consumption will be the most important use of water to be protected, but there are other groundwater uses, such as agriculture, with specific water quality requirements which shall also be protected. Appropriate criteria for these two uses are given in Tables 4 and 5 of the "Blue Book". In addition, protection of aquatic life (Table 1 of the "Blue Book") is a consideration in cases where ground water is a significant component of streamflow.

4.2 Guidelines

4.2.1 Regulated Sources of Contamination

Regulated refers to those activities which require specific approval under the *Ontario Water Resources Act* or the *Environmental Protection Act.*

The waste control requirements for proposed regulated waste discharges shall be established on a case-by-case basis. As a general policy, water quality degradation shall be controlled in order to protect reasonable uses, existing or proposed, of both ground and surface waters. The Ministry requirements relating to the quantity and the quality of the discharge shall be specified in the Certificate of Approval. Control measures may also be stipulated in the Certificate of Approval.

The treatment or elimination of pollutants from existing activities shall be required where it is demonstrated that such measures are practicable and necessary to correct use impairment and will prevent further degradation or improve water quality. Where such measures are not practicable, the Ministry may require replacement of the affected supplies.

4.2.2 Unregulated Sources of Contamination

Unregulated refers to those activities which do not require specific approval under the *Ontario Water Resources Act* or the *Environmental Protection Act.*

All reasonable measures shall be undertaken to reduce or prevent the contamination of ground water by proposed or existing unregulated activities.

5.0 Groundwater Quantity Management

5.1 Goal

To ensure the fair sharing and conservation of ground- water.

5.2 Guidelines

5.2.1 Permits to take Water

Takers shall control groundwater surface takings to prevent water supply interference wherever possible through a water taking permit program under the *Ontario Water Resources Act*, Section 34.

5.2.2 Resolution of Interference Problems

In the event that a groundwater taking authorized by permit interferes with another water supply obtained from any adequate source that was in use prior to the issuance of the permit, the party causing the interference shall restore the affected supply or reduce the taking to eliminate the interference.

5.2.3 Groundwater Conservation

All reasonable and practical measures shall be taken to promote the conservation of groundwater.

6.0 Sediment Quality Guidelines

6.1 Goal

To protect the aquatic environment by setting safe levels for metals, nutrients and organic compounds.

6.2 Guidelines

The Ministry's Sediment Quality Guidelines establish three levels of effects designed to help environmental managers determine:

- when sediments may be considered clean;
- when to take action and what action to take to mitigate contaminated sediment;
- when dredged material is suitable for open-water disposal;

- what levels of contamination are acceptable for short periods of time while the source of the contamination is being controlled and cleanup plans are being developed;

- what levels of contamination are considered severe enough to consider the possibility of either removing the sediment or covering it with a layer or two of cleaner sediment (capping).

6.3 Procedure

Complete details are contained in Procedure B-1-3: "Protection and Management of Aquatic Sediment Quality in Ontario (August, 1993)"

7.0 Lakefill Quality Guidelines

7.1 Goal

To protect the aquatic environment from the physical effects of fill materials and contaminants that may be found in such materials.

7.2 Guidelines

The Guidelines incorporate features of the Sediment Quality Guidelines to ensure the protection of sediment and the Provincial Water Quality Objectives to ensure the protection of water quality and water uses.

They include environmental criteria related to chemical and physical effects of lakefill construction, categorization of fill, and procedures for applying the lakefill quality guidelines as well as the Sediment Quality Guidelines and the Interim Confined Fill Guidelines.

7.3 Procedure

Complete details are contained in Procedure B-1-4: "Fill Quality Guidelines for Lakefilling in Ontario (1992)".

PROCEDURE B-1-1
PIBS# 3303

WATER
MANAGEMENT

POLICIES

GUIDELINES

PROVINCIAL WATER QUALITY OBJECTIVES

OF THE

MINISTRY OF ENVIRONMENT AND ENERGY

JULY, 1994

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1.0 INTRODUCTION

1.1 Preamble

This 1994 publication contains the Ministry of Environment and Energy policies and guidelines for the management of the province's water resources. It gives direction on how to manage the quality and quantity of both surface and ground waters.

With respect to surface water quality the goal is to ensure that the water quality is satisfactory for aquatic life and recreation and that water uses which require more stringent water quality be protected on a site specific basis. The Provincial Water Quality Objectives (PWQO's) will protect aquatic life and recreation uses and policy direction is provided about how to deal with situations where water quality is better or worse than the Objectives.

Ground water quality is to be preserved to protect the greatest number of uses.

Surface and ground-water quantity is to be managed to ensure a fair sharing, conservation, and sustainability of the resource.

1.2 Background

In 1970, the Ontario Water Resources Commission (OWRC) published "Guidelines and Criteria for Water Quality Management in Ontario". It was based on the 1967 publication by the OWRC entitled "Policy Guidelines for Water Quality Control in the Province of Ontario" and introduced water quality criteria for various uses. The 1970 publication concerned itself almost exclusively with surface water quality management.

In 1978, the Ministry of the Environment substantially revised and expanded the 1970 OWRC publication to include a range of policies and implementation procedures for surface and ground water quality and quantity management. The 1978 publication was modified in 1984 by incorporating changes to the Provincial Water Quality Objectives, but the goals, policies and implementation procedures for water management remained unchanged. This 1994 publication updates the 1984 publication but maintains the original policy directions. It provides a framework for a number of detailed guidance documents which assist in the implementation of the various policies.

This publication does not contain detailed procedures on how to achieve the protection of the water resources as defined by the policies and guidelines. Instead, it provides the basis upon which the limits of the uses of the resources can be established. For example, pollutant discharge limits can be determined based on the policies for water quality and the existing physical, chemical and biological conditions of the receiving water. How these limits may be achieved is a matter of local choice or conditions and other pollutant management strategies. Implementation details are contained in numerous supporting referenced documents throughout the publication.

1.3 MOEE's Legislative Authority

The Ministry of Environment and Energy's legislative authority to manage water comes primarily from two acts, the Ontario Water Resources Act (OWRA) and the Environmental Protection Act (EPA). The OWRA, which gives the MOEE extensive powers to regulate water supply, sewage disposal and to control sources of water pollution, expressly states that for the purpose of the Act the Minister has the supervision of all surface and ground waters in Ontario. The EPA prohibits the discharge of contaminants to the natural environment, including water except where specifically permitted by a Certificate of Approval. The goals, policies, and guidelines set out in this document assist those making decisions under or related to these Acts. They give, for example, directions that assist in defining site-specific effluent limits, which then may be incorporated into Certificates of Approval or Control Orders. These control documents are issued under the authority of the legislation, and thus become legally binding and constitute the basis for compliance and enforcement actions. The policies and guidelines themselves do not have any formal legal status but, by their successful use over the years, are now seen as standard practices for water resources management.

There are many other important aspects of water management that do not fall under the jurisdiction of the MOEE, but are the responsibility of other provincial and federal jurisdictions, most notably the Ontario Ministries of Natural Resources, Health and Agriculture, Food and Rural Affairs, Conservation Authorities and the Federal Departments of Fisheries and Oceans and Environment Canada.

1.4 The Policies and Guidelines of Water Management

General

The policies and guidelines in this publication are based on important principles such as the protection, preservation, and sustainability of the province's water resources for future generations. In order to effectively implement these principles, ecosystem and watershed management, how pollutants are controlled, and the inter-relationship of air, water and land management are all important considerations.

Ecosystem Management

The ecosystem approach views the ecosystem as composed of air, water, land and living organisms, and the interactions among them. It is the basis for environmental protection and resource management. It requires consideration of the cumulative effects on the environment, the inter-dependence of air, water and living organisms, and the relationships among the environment, the economy and society. Within the context of water resource management, ecosystem management includes the physical, chemical and biological components and their inter-relationships.

Environmental Protection and Multi-Media Considerations

The water management policies and guidelines supporting Provincial Water Quality Objectives (PWQO's) are the basis for establishing acceptable limits for water quality and quantity, consistent with the protection of the aquatic ecosystem and ground-water. They are equally applicable to local site specific situations, an entire watershed, or the Great Lakes. They establish the limit or the extent to which a water resource can be used without interfering with other uses.

In setting the limits or requirements for the protection of the water resource, the protection of other media such as land and air must be considered and are taken into account in the Approvals and Environmental Assessment processes. A project may have to be altered or scaled down to achieve the appropriate protection of all media. Multi-media considerations may lead to more stringent limits compared to those needed to protect the water resource alone.

MOEE's environmental protection strategy places priority on preventing, then minimizing the creation of pollutants. When the creation of pollutants cannot be avoided, the Ministry's priority is to prevent their release to the environment and second, to minimize their release.

a) Pollution Prevention

A guiding principle for the management of pollutants is that the pollution prevention approach is far more desirable than end of pipe treatment. Pollution prevention includes practices that eliminate or reduce through conservation or more efficient use of hazardous or non-hazardous materials, energy, water, or other resources. Finding alternative production processes and chemicals, using best management practices and water conservation are preferable approaches to simply concentrating on meeting the established effluents limits through waste treatment.

b) Management of Hazardous Substances

Hazardous substances (i.e. persistent, bioaccumulative toxic substances), should be dealt with regard to their impact on the ecosystem. These hazardous properties make control on an ecosystem and multi-media (air, water, land) basis absolutely essential. The hierarchial management approach of reducing discharges to zero through banning or phasing out, or at the very least, curtailing escape to the environment as much as possible, is one of the fundamental approaches for the control of these pollutants in Ontario.

c) Municipal and Industrial Strategy for Abatement (MISA)

The limits regulations developed through the MISA program have as their goal the virtual elimination of persistent toxic substances. The effluent limits contained in these regulations generally are based on levels achievable by best available treatment technology economically achievable. These regulations represent a major and important component in the Ministry's strategy to abate pollution sources and improve the ecosystem.

Watershed Planning

Watershed planning considerations address the inter-relationships of the hydrologic regime, water use patterns and land use planning thus making watershed planning a preferred basis for water management decisions. In keeping with the ecosystem approach to water resource management, the inter-relationship of surface and ground water quality and quantity have to be recognized in water management decision making processes. For example, decisions related to Permits To Take Water should be reviewed for their potential cumulative impact on water quality.

Any activity that has the potential for affecting water quality or quantity requires close scrutiny. For example, the development of land and the resulting non-point sources of pollution have proven to have significant impact on water resources, and thus deserve careful attention. The inter-relationships of land use management and water management have to be

clearly understood and considered if the principles of protection, preservation and sustainability are to be preserved.

2.0 PROVINCIAL WATER QUALITY OBJECTIVES

Provincial Water Quality Objectives (PWQO) are numerical and narrative criteria which serve as chemical and physical indicators representing a satisfactory level for surface waters (i.e. lakes and rivers) and, where it discharges to the surface, the ground water of the Province. The PWQO are set at a level of water quality which is protective of all forms of aquatic life and all aspects of the aquatic life cycles during indefinite exposure to the water. The Objectives for protection of recreational water uses are based on public health and aesthetic considerations.

Provincial Water Quality Objectives are intended to provide guidance in making water quality management decisions such as the designation of the surface waters of the Province which should not be further degraded. They are often used as the starting point in deriving waste effluent requirements included in Certificates of Approval and other instruments issued to regulate effluent discharges. They are used to assess ambient water quality conditions, infer use impairments, assist in assessing spills and monitoring the effectiveness of remedial actions.

The Ontario Ministry of Environment and Energy has established a comprehensive process for setting Provincial Water Quality Objectives as described in the MOEE publication "Ontario's Water Quality Objective Development Process", 1992. Reference documents providing details on the development of each PWQO are also available from MOEE.

A complete listing of the PWQO is contained in Appendix A. The PWQO listing is routinely updated to reflect new or revised Objectives.

In addition to the Provincial Water Quality Objectives, water resource managers can employ, where appropriate, a variety of other Objectives or Guidelines that relate to specific uses. The Ontario Drinking Water Objectives, published by MOEE, contains a comprehensive list of treated drinking water objectives primarily employed for the protection of public health. The Canadian Water Quality Guidelines, published for the Canadian Council of the Ministers of the Environment, contain a wide range of specific-use objectives including agricultural uses and industrial water supplies.

3.0 SURFACE WATER QUALITY MANAGEMENT

3.1 Goal

The surface waters of Ontario are put to many uses, and each use has specific water quality requirements. As a general management principle, water quality must be protected, preserved or restored to permit the greatest number of uses, based on the best interest of the people of Ontario. Water which meets the water quality requirements for the protection of aquatic life and recreation (i.e. the Provincial Water Quality Objectives) will, in most cases, be suitable for other surface water uses.

The surface water quality management goal is, therefore:

> *TO ENSURE THAT THE SURFACE WATERS OF THE PROVINCE ARE OF A QUALITY WHICH IS SATISFACTORY FOR AQUATIC LIFE AND RECREATION.*

Provincial Water Quality Objectives are useful indicators of, but not direct measurements of aquatic ecosystem health. Non-chemical factors such as the loss of habitat, sedimentation, water quantity regulation and the introduction of non-indigenous species often have profound and over-riding influences on aquatic ecosystems.

Meeting the Provincial Water quality Objectives is the minimum requirement. Considerations such as ecosystem health, the additive effects of more than one chemical, or the protection of other uses may lead to more stringent requirements. For example, in site specific situations, where better water quality is required than that provided by the PWQO's to protect beneficial uses in a given location, the appropriate, more stringent criteria shall be applied in that location.
Ontario borders on inter-provincial and international waters, and the implications of the Province's activities must be considered in that context. For example, the Province has agreed that the Specific Water Quality Objectives contained in the Great Lakes Water Quality Agreement or more stringent Provincial objectives shall be used in environmental programs to achieve and maintain Great Lakes water quality. Also, Ontario enforces effluent requirements developed by the Federal Government for specific industrial sectors and for specific pollutants.

3.2 Policies

The following policies deal with two situations: a) where water qualify is better than the Provincial Water Quality Objectives; b) where water quality presently does not meet the Objectives. These water quality designations are made on a parameter by parameter basis and compliance or non-compliance with the Provincial Water Quality Objectives should be determined from data that adequately reflect the spatial and temporal variations of the quality of the waterbody under consideration.

3.2.1 Areas with Water Quality Better than the Objectives

Policy 1

"In areas which have water quality better than the Provincial Water Quality Objectives, water quality shall be maintained at or above the Objectives."

Although some lowering of water quality is permissible in these areas, degradation below the Provincial Water Quality Objectives will not be allowed, ensuring continuing protection of aquatic communities and recreational uses.

3.2.2 Areas with Water Quality Not Meeting the Objectives

Policy 2

"Water quality which presently does not meet the Provincial Water Quality Objectives shall not be degraded further and all practical measures shall be taken to upgrade the water quality to the Objectives."

Evaluations of existing conditions in problem areas shall be conducted and all reasonable and practical measures shall be taken to upgrade water quality to the Provincial Water Quality Objectives. Where new or expanded discharges are proposed, no further degradation will be permitted and all practical measures shall be undertaken to upgrade water quality. However, it is recognized that, in some circumstances, it may not be technically feasible, physically possible or socially desirable to improve water quality toward the Provincial Water Quality Objectives.

Accordingly, where it is clearly demonstrated that all reasonable and practical measures to attain the Provincial Water Quality Objectives have been undertaken but where:

1) the Provincial Water Quality Objectives are not attainable because of natural background water quality; or

2) the Provincial Water Quality Objectives are not attainable because of irreversible human-induced conditions; or

3) to attain or maintain the Provincial Water Quality Objectives would result in substantial and widespread adverse economic and social impact; or

4) suitable pollution prevention techniques are not available;

then deviations from this policy may be allowed, subject to the approval of the Ministry of Environment and Energy. Detailed procedures for preparing a deviation are described in "Guideline for Handling Requests for Deviations." in the MOEE document entitled Deriving Receiving Water Based, Point-source Effluent Requirements for Ontario Waters (1994).

Before approval for a deviation is granted, consideration should be given to the impact of the deviation on the mandate or concerns of other agencies and the public. Agencies such as the Ministries of Natural Resources, Health, Agriculture, Food and Rural Affairs, Conservation Authorities and the Federal Departments of Environment and Fisheries and Oceans should be consulted, where appropriate.

Where public hearings into proposals for new or expanded discharges are held under the Environmental Assessment Act or the Ontario Water Resources Act, such hearings may be utilized to consider this issue.

As a condition to granting a deviation, a periodic review should be required of the reasons leading to the deviation and an evaluation of their continued relevance.

3.3 Hazardous Substances

Hazardous substances, acting individually or in combination with other substances, can cause death, disease including cancer, behaviour abnormalities, genetic mutations, physiological malfunctions, malfunctions in reproduction or physical deformities in organisms (plants and animals, including humans) or their offspring. The consequences of contamination of the environment by hazardous substances may also include a loss of valuable species, restrictions on important socio-economic activities or a variety of irreversible ecological changes that threaten future use and enjoyment of the environment. Hazardous substances can occur in nature (e.g. mercury) or can be created by human activity (e.g. PCB). Some have been developed to meet important needs (e.g. DDT) and some are unintentional by-products of industrial activities (e.g. dioxins).

Some hazardous substances listed in Appendix B, have been banned from use in Ontario. Other candidate substances for bans, phase-outs or reductions are included in Tables 1.7 and 1.8 in the MOEE publication entitled "Candidate Substances For Bans, Phase-Outs Or Reductions - MultiMedia Revision" October 1993.

Because of their inherently hazardous nature, every effort should be made to prevent these substances from gaining access to the environment. From an environmental protection perspective, the application of pollution prevention principles, that is, avoiding the creation of the pollutants in the first place, is far more desirable than reliance on waste treatment.

The MOEE policies for the management of hazardous substances in surface waters are:

Policy 3
Prevent the release, in any concentration, of hazardous substances that have been banned.

Provincial Water Quality Objectives have been developed for many of the banned hazardous substances in Appendix B. It should be emphasized that these Objectives are not to be used for the development of new waste loadings for these substances. Rather, they provide a benchmark available to assess the environmental implications of past releases or accidental losses and remediation work.

Specific control procedures for the other hazardous substances as for example those contained in the "Candidate Substances For Bans, Phase-Outs Or Reductions" report have yet to be formulated pending further technical and socio/economic evaluations. The MOEE policy for dealing with these substances is:

Policy 4

Ensure that special measures are taken on a case by case basis to minimize the release of hazardous substances that have not been banned.

For these hazardous substances it is not appropriate to use the assimilative capacity of receiving waters and mixing zones to attenuate the treated wastes.

3.4 Mixing Zones

A mixing zone is defined as an area of water contiguous to a point source or definable diffuse source where the water quality does not comply with one or more of the Provincial Water Quality Objectives. A mixing zone is, under no circumstances, to be used as an alternative to reasonable and practical treatment. It must be designed to be as small as possible and is one factor in establishing effluent requirements.

The concept of mixing zones recognizes that the cost of treating all waste discharges to the PWQO's may not be justified. As a general principle, the dilution of such effluents, and thus the use of mixing zones, should be minimized and limited to conventional pollutants.

Policy 5

Mixing zones should be as small as possible and not interfere with beneficial uses. Mixing zones are not to be used as an alternative to reasonable and practical treatment.

Conditions within a mixing zone must not result in toxic conditions or irreparable environmental damage including risk to ecosystem integrity and human health nor interfere with water supply, recreational or other water uses.

Terms and conditions related to a mixing zone will be designated on a case-by-case basis and may be specified in Certificates of Approval, Control Orders, Requirements and Directions, or approvals to proceed under the Environmental Assessment Act. Mixing zones do not apply to discharges that have not received MOEE approval (eg. spills and illegal discharges).

A detailed description of mixing zone requirements and implementation procedures are contained in Deriving Receiving-Water Based, Point Source Effluent Requirements for Ontario Waters, MOEE, 1994.

3.5 Implementation Procedures for Effluent Requirements

Substances that impair water and sediment quality are a major environmental problem. Many of these substances are toxic to aquatic life such as fish and aquatic invertebrates, in both the water column and sediment. Others are persistent and bioaccumulative and can cause food chain effects resulting in elevated levels of contaminants in fish, wildlife, birds and people who eat fish. Substances, such as nutrients, when present in excess can upset the natural balance of an ecosystem. Still others can impair the use of the water by producing tastes and odours.

Polluting substances enter the water from many sources. Industrial and municipal discharges of wastewater, contaminated runoff from urbanized and agricultural areas, deposition of air pollutants, and lakefilling all are important sources of contaminants. Some substances, such

as metals, are naturally occurring and their presence in water can be the result of natural processes.

The following are general procedures for determining effluent requirements. In general terms the directions given deal with how to define limits for wastewater discharges to surface water using the two policies for surface water quality management described in Section 3.2 as well as the policies dealing with hazardous substances, and mixing zones which are presented in sections 3.3 and 3.4, respectively. Detailed directions for setting effluent requirements are contained in the MOEE publication, "Deriving Receiving -Water Based, Point-Source Effluent Requirements For Ontario Waters", 1994.

Guidelines and procedures related to the management of aquatic sediments (MOEE Policy B-1-3) and lakefilling (Policy B-1-4) are fully described in MOEE publications "Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario, 1993" and "Fill Quality Guidelines for Lakefilling in Ontario, 1992", respectively.

3.5.1 General Procedures for Establishing Effluent Requirements

In establishing effluent requirements for discharges to surface waters, the procedures outlined below should be followed:

1) Site-specific receiving water assessments will be conducted to assess existing conditions and determine effluent requirements based on the waste assimilative capacity of the receiver.

2) The site-specific effluent requirement, so derived, will be compared, where applicable, to appropriate federal or provincial regulations or guidelines for effluent discharges and the most stringent requirement will be applied.

3) The effluent requirement derived from the above procedures, expressed as waste loadings and/or concentrations, will be incorporated into a Certificate of Approval or other control document.

4) For existing discharges in areas where water quality is degraded and does not meet the Provincial Water Quality Objectives, the Ministry may develop a pollution control program with each discharger to meet the effluent requirement determined from the above procedures.

Through the incorporation of water quality based limits into legally enforceable control documents such as a Certificate of Approval, the policies for water quality management become enforceable. These limits most commonly are for municipal or industrial point sources, but may also be applied to cooling water, stormwater or other polluting sources.

4.0 GROUND WATER QUALITY MANAGEMENT

Ground water in Ontario is an important source of water for various uses, including domestic, public, agricultural, commercial and industrial water supplies. Ground water is often the primary source of rural and urban drinking water supplies. It is an important component of the aquatic ecosystem. Streamflow originates and is maintained in many parts of the province through sources from ground water. Ground water maintains wetland ecosystems.

For practical proposes, and with present control technology, ground water contamination, in most cases, can be considered long term once it occurs. In general, restoration of ground water quality is difficult and extremely expensive. Therefore, the emphasis of ground water management is on pollution prevention. Ontario's ground water quality management principle and implementation procedures reflect the fact that ground water differs from surface water in significant respects.

In the majority of cases, consumption by humans will be the most important use of water to be protected, but there are other ground water uses such as agriculture with specific water quality requirements which also will be protected. The protection of aquatic life is a very important consideration in cases where ground water is a component of streamflow.

Recognizing that ground water is a valuable resource supporting a variety of uses, the Ministry of Environment and Energy's policy for ground water quality management is:

Policy
To protect the quality of ground water for the greatest number of beneficial uses.

4.1 Implementation Procedures

4.1.1 Regulated Sources of Pollution

Activities with the potential to adversely affect ground water that require MOEE approval under the OWRA or EPA are wide-ranging and include water works, wastewater treatment infiltration basins, landfills, waste disposal into deep wells, spray irrigation, sludge utilization or disposal operations, septic tank systems and mine tailings.

The treatment or elimination of pollutants from existing regulated sources is required where the polluter fails to demonstrate that such measures are impractical and unnecessary to remediate use impairment, prevent further degradation and improve water quality. Where such measures are not practicable, the Ministry may require replacement of the affected supplies.

The waste control requirements for proposed regulated sources of pollution are established on a case by case basis. Water quality degradation is controlled to protect existing and potential reasonable uses of both ground and surface waters. The MOEE may stipulate requirements for these activities related to the quality and quantity of the discharge in a Certificate of Approval.

MOEE Policy B-7, "Incorporation of the Reasonable Use Concept into the MOEE Ground water Management Activities", contained in the MOEE Manual of Guidelines and Procedures, 1994, addresses active or proposed sources of contaminant discharges to ground water that are being permitted or regulated by the Ministry. This includes landfills, exfiltration lagoons and large subsurface disposal systems . Policy B-7 provides a procedure for determining the reasonable use of ground water and establishes limits to the amount of degradation that will be allowed such that this use will not be impaired.

4.1.2 Unregulated Sources of Contamination

There are a number of activities that do not require specific approval under the Ontario Water Resources Act or the Environmental protection Act but have the potential to contribute to ground water contamination. They include non-point source activities (i.e. crop fertilization, manure application, road deicing), salt storage areas, unlicensed and closed landfills, leaks, spills and decommissioning clean-up.

The treatment or elimination of pollution from unregulated sources will be required where it is demonstrated that such measures are practicable and necessary to correct use impairment and will prevent further degradation or improve water quality. Where such measures are not practical, the Ministry may require replacement of the affected supplies.

MOEE Policy B-9, "Guidelines for the Resolution of Ground water Quality Interference Problems", contained in the MOEE Manual of Guidelines and Procedures, 1994, addresses the cleanup or remediation of contaminant discharges to the ground water that have not been subject to approval by the Ministry. This includes such things as spills and closed waste disposal facilities. Policy B-9 establishes the urgency of the Ministry response, an approach based on cost/benefit analysis for determining the extent or degree of cleanup and establishes the Ministry position with respect to the restoration of water supplies that have been contaminated.

5.0 WATER QUANTITY MANAGEMENT

The protection and control of water quantity is a key component of Ontario's water management strategy. Management of water quantity is needed to avoid conflicts among various users.
Water quantity and quality are closely related, inasmuch as the amount and physical characteristics of water available are an important aspect of water quality. Ground water quantity management is essential for the added reason that ground water is often an important component of streamflow.

Water quantity management in Ontario involves a combination of common law, land patent, and federal and provincial statutes. The main involvement of the Ministry of Environment and Energy in this field is through the water taking permit system under the Ontario Water Resources (OWR) Act. Specific details are contained in "Permit To Take Water Program Guidelines and Procedures Manual", MOEE, 1984.

Recognizing the many and varied uses of water, the MOEE policy for the management of water quantity is:

Policy
To ensure the fair sharing, conservation and sustainable use of the surface and ground waters of the province.

5.1 Guidelines Common to Surface and Ground Water

Many water quantity management guidelines and procedures are common to both surface and ground water and are summarized in this section. Requirements that are specific to either surface water or ground water are contained in Sections 5.2 and 5.3, respectively.

5.1.1 Permits To Take Water

Guideline
"Water takings will be controlled to prevent interference with other uses of water wherever possible and to resolve such problems if they do occur."

Under the Ontario Water Resources Act, the Ministry of the Environment and Energy administers a water permit program, under which most takings in excess of 50,000 litres in a day require authorization by means of a Permit to Take Water. This includes temporary takings such as withdrawals from a well for purposes of a pumping test.

Takings which are generally exempt from the water permit legislation, but which are found to interfere seriously with other users, can be prohibited without a permit and thus brought under the provisions of a water permit. The only exception to this provision is the taking of water by an individual for ordinary household purposes, livestock watering, and fire fighting.

An application for a water permit is reviewed in light of information concerning the availability of the supply, the use to which the water is to be put, and the effects of the proposed taking on existing uses. Permitees may be required to keep records of the withdrawals.

When evaluating the relative priority of uses in an area where there is insufficient water to meet established and new uses, the taking of water for private domestic and farm purposes is considered the most important use, generally followed by municipal water supply. The taking of water for industrial, commercial and irrigation purposes is regulated by the availability of the supply, the efficiency of use and established uses in an area. The use of water for pollution control, flood control, fire protection, recreation, wildlife preservation and the protection of habitats are also important considerations.

5.1.2 Water Quality/Quantity Inter-relationships

Guideline
"Surface and ground water withdrawals, and the discharge of water to surface water bodies will be controlled to assist in maintaining or restoring water quality for the protection of aquatic ecosystems and recreation and to provide for downstream withdrawal uses."

Water takings should be controlled to avoid water quality impairment as well as to protect withdrawal uses. Under appropriate conditions, streamflow augmentation from either surface or ground water sources may be considered as a supplementary means of maintaining water quality. Controls on land-use practices, discharges of water from urban drainage, and agricultural drainage and similar artificial discharges will be encouraged to prevent water quality degradation and to minimize any increase in peak flows.

5.1.3 Water Conservation

Guideline
"All reasonable and practical measures should be taken to conserve the quantity of surface and ground water to sustain ecosystem integrity and to maximize its availability for existing or potential uses."

In flowing well areas, appropriate management practices incorporating site-specific considerations should be undertaken to conserve ground water and thereby protect streamflows. Where a new flowing well is constructed, a flow control device must be installed in accordance with the requirements of Ontario Regulation 903.

Explicit statements respecting water conservation should be incorporated into appropriate planning documents and all parties proposing or reviewing proposed projects in such areas should ensure that appropriate conservation measures are undertaken.

5.1.4 Surface/Ground Water Quantity Inter-relationships

Guideline
" The importance of the inter-relationships between surface and ground water quantity will be taken into account in water quantity management decisions."

If the taking of water from wells causes interference with streamflow, restoration of supplies is required if serious interference with surface water uses occur.

Ground water takings that impact streams will be allowed only after due regard to the maintenance of sufficient streamflow to protect both in-place and withdrawal uses downstream.

5.2 Additional Provisions - Surface Water Quantity Management

While the water permit legislation is designed to manage the use of water resources in the Province, riparian rights are not superseded, but may be limited in some cases by the water permit legislation.

Permits for stream takings shall contain a requirement that the taking of water be carried out in such a manner that downstream flow is not stopped or reduced to a rate that will interfere with downstream uses of water or the natural functions of the stream.
A permit for a taking from any surface waterbody shall contain a requirement that if the taking interferes with the use of water by other persons, the terms and conditions of the permit may be altered.

Other special terms and conditions relating to a taking may be stipulated on a case-by-case basis to deal with special circumstances.

When water is taken from streams which cease to flow seasonally due to natural causes, downstream flow must be maintained whenever there is an inflow. The release of water from storage to maintain downstream flow is not required when there is no inflow.

With respect to the taking of cooling water, the design and location of the water intake must be such that entrainment of fish, including larval fish and eggs, and other aquatic life is minimized.

5.3 Additional Provisions - Ground Water Quantity Management

If a ground water taking authorized by permit interferes with other water supplies obtained from any adequate sources that were in use prior to the issuance of the permit, the permittee shall restore the affected supplies or reduce the taking so as to eliminate the interference.

The free flow from a flowing well is not protected in the event of interference by another ground water taking. In the event of interference with a flowing well supply, restoration of the supply is required, provided that the well was equipped with at least a shallow-well pump having an adequate intake located in the portion of the well that is in direct hydraulic connection with the water-bearing formation. Furthermore, the well had to be capable of meeting the daily water demands on a continuous basis by a combination of its storage, water yielding and pumping capabilities, prior to interference.

The restoration of a water supply is not required in an area where a property has community water service available if the interference is caused by the construction or operation of works for the improvement and service of the community, such as municipal wells, sewers, water mains, roads and bridges. Where interference in a water serviced area is caused by an operation not associated with a community improvement, restoration of a water supply is required.

Parties causing short-term interference with existing supplies where water service is or is not available are required to make available a temporary supply of water to those experiencing interference. This applies to interference resulting from such operations as pumping tests, excavation dewatering, and other short-term water takings.

Ground water encountered during construction projects and excavations where ground water may flow by gravity either out of the excavation or along granular trench bedding can cause serious interference with water supplies by lowering well water levels. The person whose works cause the problem may be required by notice under Section 34 of the OWR Act to stop or control the leakage or to take such measures as the notice may require, such as to restore the affected supply.

Artificial ground water recharge should be encouraged wherever practical to conserve ground water.

Protection of areas with high infiltration rates is generally a good management practice. In evaluating proposals for development in significant infiltration areas, the effects on infiltration rates and the quality of the infiltrating water should be considered.

GLOSSARY

Acute Toxicity - An adverse response, ranging from injury to death, following exposure of short duration relative to the normal lifespan of the organism.

Additive Effects - Toxic interactions of two or more substances on organisms producing a result such that the total effect approximately equals the sum of the individual effects.

Aesthetic - Dealing with those aspects of water that are perceived by the senses (e.g. taste or odour).

Assimilative Capacity - the limit of a waterbody to transform and/or incorporate substances (e.g. nutrients) by the ecosystem, such that the water quality does not degrade below a predetermined level.

Background Water Quality - The physical, chemical and/or biological conditions of a waterbody at a point upstream/up current of a polluting source. The establishment of background water quality may be based on historical data or on water quality in a similar, unaltered waterbody.

Ban - Prohibition of the use or release to the environment of specific substances judged to be particularly hazardous. Bans would normally be applied on a provincial or national basis.

Best Management Practices -

Best Available Treatment Technology - can include, in order of preference - changes in production processes, chemical substitution, in-plant controls, best management practices, water conservation, waste treatment technologies, energy conservation.

Bioaccumulation - the process by which chemicals are amassed by organisms from water directly or through the consumption of food containing the chemicals.

Certificate of Approval (C of A) - A legal document issued, at a proponent's request, by a Designated Director of the Ministry of Environment and Energy under the authority of the Ontario Water Resources Act. C of A's may include effluent requirements and monitoring requirements.

Common Law - Law which relies for its authority on the decision of courts and is recorded in law reports as the decisions of judges along with the reasons for their decisions, as opposed to law established in a statute.

Compliance - A state achieved by adhering to the legislative and regulatory requirements of the Ontario Ministry of Environment and Energy. These requirements cover a wide range of activities, from the prevention, reduction and elimination of pollution, to the obtaining of approvals and licences, to the completion of routine paperwork and the filing of reports.

Contaminant - A substance which, once in the water, may pose a threat to the ecosystem and/or human health, as well as uses such as water supply, recreation, and aesthetic conditions.

Control Order - A document that requires the discharger to take specific action with an associated deadline. It is authorized by statute, binding upon the recipient, and directly enforceable by prosecution.

Conventional Pollutants - Traditional indicators of environmental quality including BOD, nutrients and solids.Materials defined as hazardous substances are not included in this category.

Effluent - the wastewater discharged to a receiving water body.

Effluent Limit - A legally enforceable effluent requirement.

Entrainment - The incidental capture of aquatic organisms in water being extracted (e.g. pumped) from a natural waterbody.

Flowing Well - a well in which the static water level is above ground level.

Hazardous Substances - chemicals that are persistent, bioaccumulative and extremely toxic. They including substances which, individually or in combination with other substances, can cause death, disease including cancer, behaviourial abnormalities, genetic mutations, physiological malfunctions and/or physical deformities.

Implementation Procedures - A set of activities required for the appropriate execution of a Water Management policy or guideline.

Irreversible Man-induced Conditions - An existing condition impairing water quality and/or uses caused by human activity. The actions are such that natural conditions cannot practically be restored. Examples might include removal of old-growth forest or urbanization.

Land Patent - A grant of land from the Crown under the Great Seal which may retain some interests in the land for the Crown.

Natural Background Water Quality - Chemical, physical and biological quality of a waterbody, if unaffected by human activity.

Non-indigenous - Not native or not belonging naturally to an area.

Non-point Source - A non-specific or diffuse source entering the aquatic environment. Commonly, any source that cannot be described as a point source. Usually, this type of source is not amenable to collection and, if necessary, treatment.

Objectives - Provincial Water Quality Objectives

Parameter - A measurable or quantifiable characteristic or feature of water quality.

Permit to Take Water - A permit issues by a designated Director of the Ministry of Environment and Energy, authorizing the taking of surface or ground water in excess of 50,000 litres per day as provided for under the Ontario Water Resources Act.

Permittee - The individual or group to whom a permit has been granted.

Persistence - Longevity in the environment usually expressed as half-life.

Persistent Pollutant - A substance with an environmental half-life in excess of 50 days.

Point source - A source of pollution that is discharged to the environment at a specific location. It is quantitatively and qualitatively definable.

Pollution Prevention - Any action which eliminates or reduces the creation of pollutants or waste at their source through measures such as substitution/reduction in use of a raw product, production redesign, process change, in-process recycling and/or improved maintenance and operating procedures.

Receiving Water - A waterbody to which a discharge is directed.

Remedial Actions - Actions undertaken to upgrade water quality and restore uses to a waterbody previously impaired. Initial actions are usually to eliminate or reduce the source(s) of the problem and can include physical intervention (e.g. dredging, artificial aeration, flow augmentation, etc.)

Riparian Rights - The common law rights of owners of property along a river or shore of other bodies or water. These rights include, stated generally, the right to make reasonable use of the water flowing past their land.

Streamflow Augmentation - The addition of water, often from reservoir storage or groundwater, to a river or stream to increase its base flow.

Sustainability - The utilization of a resource in a manner that the resource will be adequately protected for indefinite future use.

Surrogate - A convenient and/or practical substitute

Toxic substance - A substance capable of producing an adverse response, ranging from injury to death, in a living organism

Toxicity - An adverse response, ranging from injury to death, in a living organism.

Waste - any solid, liquid, gas, odour, heat, sound, vibration, radiation or combination of any of them resulting directly or indirectly from the activities of man which may: impair the quality of the natural environment for any use that can be made of it; cause injury or damage to property or to plant or animal life; cause harm or material discomfort to any person; adversely affect the health or impair the safety of any person; or render any property or plant or animal life unfit for use by man.

Water Conservation - Preservation of the quantity of available water through judicious use, reuse and minimal wastage.

Waste Assimilation - (See Assimilative capacity)

Watershed - The area of land drained by a river/stream and its tributaries.

PROCEDURE B-1-5
PIBS# 3302

DERIVING RECEIVING-WATER BASED, POINT-SOURCE EFFLUENT REQUIREMENTS FOR ONTARIO WATERS

Ministry of Environment and Energy

July, 1994

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INTRODUCTION

This report describes the procedures used by the Ontario Ministry of Environment and Energy (MOEE) to establish receiving-water based effluent requirements for point source discharges to surface waterbodies. The procedures are based on the policies contained in *Water Management - Policies, Guidelines and Provincial Water Quality Objectives* (MOEE. 1994). The Provincial Water Quality Objectives (PWQO) play a major role in the development of effluent limits. Specific PWQO are listed in *Water Management.*

While primary emphasis of this document relates to setting treated effluent discharge limits from point sources of pollution such as industries and sewage treatment plants, it is recognized that other non-point or diffuse sources of pollution - urban, rural and atmospheric, can contribute substantially to water quality degradation and use impairment. Procedures for managing non-point sources of pollution are not addressed in this report.

The implementation procedures described in this report support *Water Management* and provide general direction on a wide range of procedures for determining effluent requirements for Certificates of Approval or other legal documents. The text is not all inclusive, and it is strongly suggested that proponents or their consultants contact the appropriate MOEE Regional Surface Water Assessment staff to determine if additional site specific-conditions would apply to the effluent discharge in question.

Chapter 1

LEGAL FRAMEWORK AND POLICIES

The relevant legislative authority for the control of point source discharges in the Province of Ontario is found in the Environmental Protection Act and the Ontario Water Resources Act. Discharge specifications are contained in Certificates of Approval, Control Orders and other MOEE requirements and directions (collectively known as "legal instruments"). The legal and policy framework for Certificates of Approval is summarized in the following sections.

1.1 LEGAL FRAMEWORK

The legislative authority to issue Certificates of Approval for industrial and municipal point source discharges (collectively known as sewage works) is the Ontario Water Resources Act, Section 53, R.S.O 1990. Conditions placed in these Certificates of Approval address a number of issues associated with the operation and maintenance of a sewage works. As part of these conditions, effluent requirements are determined and incorporated into the Certificate of Approval along with appropriate non-compliance criteria.

Section 28 of the Ontario Water Resources Act (R.S.O. 1990) states: "Under sections 29, 30, 32 and 33, the quality of water shall be deemed to be impaired if, notwithstanding that the quality of the water is not or may not become impaired, the material discharged or caused or permitted to be discharged or any derivative of such material causes or may cause injury to any person, animal, bird or other living thing as a result of the use or consumption of any plant, fish or other living matter or thing in the water or in the soil in contact with the water". Section 30(1) goes on to stipulate that: "Every person that discharges or causes or permits the discharge of any material of any kind into or in any waters or on any shore or bank thereof or into or in any place that may impair the quality of the water of any waters is guilty of an offence".

The Ontario Environmental Protection Act provides the legislative authority to limit the discharge of contaminants to the natural environment. Section 14(1) of the Ontario Environmental Protection Act (R.S.O. 1990) states: "Despite any other provision of this Act or the regulations, no person shall discharge a contaminant or cause or permit the discharge of a contaminant into the natural environment that causes or is likely to cause an adverse effect". Section 1 (1) of the same Act defines 'adverse effect' as one or more of "(a) impairment of the quality of the natural environment for any use that can be made of it, (b) injury or damage to property or to plant or animal life, (c) harm or material discomfort to any person, (d) an adverse effect on the health of any person, (e) impairment of the safety of any person, (f) rendering any property or plant or animal life unfit for use by man, (g) loss of enjoyment of normal use of property, and (h) interference with the normal conduct of business".

Discharge requirements also take into account the provisions of the Federal Fisheries Act for which the Ontario Ministry of Natural Resources is the agent in Ontario.

1.2 WATER MANAGEMENT POLICIES

For the development of effluent requirements, the publication *Water Management - Policies, Guidelines and Provincial Water Quality Objectives of the Ministry of Environment and Energy, 1994* (MOEE. 1994) is the primary document used to provide interpretation of the legislation. Surface water quality management is addressed under a series of Surface Water Management Policies and the Provincial Water Quality Objectives.

1.2.1 Provincial Water Quality Objectives

Provincial Water Quality Objectives (PWQO) are numerical and narrative criteria which serve as chemical and physical surrogates of healthy populations of aquatic biota. They represent a satisfactory level of quality for surface waters (i.e. lakes, rivers and streams). These criteria should also be applied to groundwater where it discharges to the surface. The PWQO are set at a level of water quality which is protective of all forms of aquatic life and all aspects of the aquatic life cycles during indefinite exposure to the water. Recreational uses of water are protected by PWQO based on public health and aesthetic considerations. The Provincial Water Quality Objectives are listed in *Ontario's Provincial Water Quality Objectives* (MOEE. 1994c). The procedures used to set PWQO are described in *Ontario's Water Quality Objective Development Process,* (MOE. 1992a).

Provincial Water Quality Objectives are intended to provide guidance in making water quality management decisions such as the designation of the surface waters of the Province which should not be further degraded. They are often used as the starting point in deriving waste effluent requirements included in Certificates of Approval and other instruments issued to regulate effluent discharges. They are used to assess ambient water quality conditions, infer use impairments, assist in assessing spills and monitoring the effectiveness of remedial actions.

1.2.2 Surface Water Quality Goal and Policies

The surface water quality management goal and policies are fully described in *Water Management (1994).* Fundamentally, they are as follows:

Goal

To ensure that the surface waters of the Province are of a quality which is satisfactory for aquatic life and recreation.

Two policies relate directly to the protection or restoration of satisfactory water quality conditions:

Policy 1

In areas which have water quality better than the Provincial Water Quality Objectives, water quality shall be maintained at or above the Objective.

Policy 2

Water quality which presently does not meet the Provincial Water Quality Objectives shall not be further degraded and all practical measures shall be undertaken to upgrade the water quality to the Objectives.

Two policies relate directly to the management of particularly hazardous substances which, if released to the environment even in small concentrations, may pose a serious threat to aquatic life, wildlife and humans.

Policy 3

Prevent the release, in any concentration, of hazardous substances that have been banned.

Policy 4

Ensure that special measures are taken on a case by case basis to minimize the release of hazardous substances that have not been banned.

When treated point-source effluents are discharged to a waterbody, there may be an area of the receiver contiguous to the discharge point where water quality degradation and use impairment could occur. This area is described as the mixing zone and addressed in Policy 5.

Policy 5

Mixing zones should be as small as possible and not interfere with beneficial uses. Mixing zones are not to be used as an alternative to reasonable and practical treatment.

1.2.3 Other Water Management Policies

The MOEE policy document *Water Management (MOEE. 1994)* also contains a number of policies, guidelines and implementation procedures related to the management of groundwater quality and the management of surface and ground water quantity. It is imperative to understand the inter-relationships of surface and ground water quality management and the important linkages between water quality and water quantity management. Management decisions related to any one of these aspects of water management can have serious implications on the others.

Groundwater Quality

Recognizing that groundwater is a valuable resource in Ontario that supports a variety of uses, the MOEE general policy for groundwater quality management is:

To protect the quality of groundwater for the greatest number of beneficial uses

Specific policies and procedures for the protection of groundwater quality from pollution from regulated and unregulated sources are contained in *Incorporation of the Reasonable Use Concept into the MOEE Groundwater Management Activities* and *Guidelines for the Resolution of Groundwater Quality Interference Problems*. Both are contained in the *MOEE Manual of Guidelines and Procedures (MOEE. 1994b)* as Guideline B-7 and B-9, respectively.

Surface and Ground Water Quantity Management

The protection and control of water quantity is a key component of Ontario's water management strategy. Water quantity and quality are closely related, inasmuch as the amount of water available and its physical characteristics are an important aspect of water quality. Ground water quantity management is essential for the added reason that ground water is often an important component of streamflow.

Recognizing the many and varied uses of water, the MOEE policy for the management of surface and ground water quantity is:

To ensure the fair sharing, conservation and sustainable development of the surface and ground waters of the province.

This general water quantity management policy is supported by a series of guidelines enunciated in *Water Management (1994)*.

1.2.4 Additional MOEE Guidance

The *MOEE Manual of Guidelines and Procedures (MOEE. 1994b)* contains the following Guidelines which may be considered in the derivation of effluent requirements:

Guideline F-2

Compliance

Guideline F-5

Levels of Treatment for Municipal and Private Sewage Treatment Works Discharging to Surface Waters

Guideline F-8

Provision and Operation of Phosphorous Removal Facilities at Municipal, Institutional and Private Sewage Treatment Works

Guideline F-10

Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only)

Additional information related to these Guidelines can be found in Appendix B.

Chapter 2

IMPLEMENTATION OF THE WATER MANAGEMENT POLICIES

The design of receiver-based effluent requirements are based directly on the Surface Water Quality Management Policies. Following are implementation details related to these policies.

2.1 AREAS WITH WATER QUALITY BETTER THAN THE OBJECTIVES (Policy 1)

When a new or expanded waste discharge is being proposed for a waterbody where the quality of water is better than the PWQO, there may be potential waste assimilation capacity available for some substances. Although some lowering of water quality may be permitted in these areas, degradation below the Provincial Water Quality Objectives will not be allowed. This will ensure continued protection of aquatic communities and recreational uses. Water resource managers should be aware of special circumstances such as very sensitive or unique ecosystems or other uses that might be affected if a discharge was to be permitted.

2.2 AREAS WITH WATER QUALITY NOT MEETING THE OBJECTIVES (Policy 2)

In areas with water quality not meeting the PWQO for a specific contaminant (Policy 2), no further degradation of water quality will be allowed for that contaminant. All reasonable and practical measures to improve water quality shall be undertaken. Daily, seasonal and annual concentrations and loadings from proposed waste water discharges are evaluated to confirm that they will not violate Policy 2. Expansion of existing discharges to Policy 2 receivers will only be permitted if the concentration and total load of the Policy 2 contaminant to the receiving stream is not increased.

It is recognized that, under certain circumstances, it may not be technically feasible, physically possible or socially desirable to achieve this condition in all water bodies in the Province. Accordingly, where it is clearly demonstrated that all reasonable and practical measures to attain the Provincial Water Quality Objectives have been undertaken but where:

1) the Provincial Water Quality Objectives are not attainable because of natural background water quality; or

2) the Provincial Water Quality Objectives are not attainable because of irreversible man-induced conditions; or

3) to attain or maintain the Provincial Water Quality Objectives would result in substantial and widespread adverse economic and social impact; or

4) suitable treatment techniques are not available;

then a deviation from Policy 2 for a specific parameter or parameters may be allowed, subject to the approval of the Ministry of Environment and Energy.
If a deviation is being sought, it must be clearly documented according to the information requirement and procedures described in Appendix C "Guidelines for Handling Requests for Deviations". A deviation must be applied for and approved prior to submitting the application for a Certificate of Approval.

2.3 HAZARDOUS SUBSTANCES

Hazardous substances, acting individually or in combination with other substances, can cause death, disease including cancer, behaviour abnormalities, genetic mutations, physiological malfunctions, malfunctions in reproduction or physical deformities in organisms (plants and animals, including humans) or their offspring. The consequences of contamination of the environment by hazardous substances may also include a loss of valuable species, restrictions on important socio-economic activities or a variety of irreversible ecological changes that threaten future use and enjoyment of the environment. Hazardous substances can occur in nature (e.g. mercury) or can be created by human activity (e.g. PCB). Some have been developed to meet important needs (e.g. DDT) and some are accidental by-products of industrial activities (e.g. dioxins).

Effluent requirements should place special emphasis and directions on the control of hazardous substances. Hazardous substances designated as being particularly dangerous in the natural environment and requiring special attention are included in Tables 1.7 and 1.8 of the publication entitled "*Candidate Substances For Bans, Phase-Outs Or Reductions - Multimedia Revision*" (MOEE, 1993). It should be noted that these listings contain some substances that are of concern, primarily, to the atmosphere and others that are of primary concern to the aquatic environment. Because of their inherently hazardous nature, every effort should be made to prevent the appropriate substances from these lists from gaining release to the environment.

Some designated hazardous substances from Table 1.7 of the *"Candidate Substances For Bans, Phase-Outs Or Reductions - Multimedia Revision"*, described above, have been banned from use. The MOEE policy clearly states that the release, in any concentration, of these banned substances be prevented (MOEE, 1994a). Provincial Water Quality Objectives have been developed for many of the banned hazardous substances, but it must be emphasized that the Objectives are not to be used for the development of new waste loadings for these substances. Rather, they provide a benchmark available to assess the environmental implications of past releases or accidental losses and remediation work.

Specific control procedures for other substances that have been designated as hazardous in Tables 1.7 and 1.8 of *Candidate Substances For Bans, Phase-Outs Or Reductions -*

Multimedia Revision, 1993 have yet to be formulated pending further technical and socio/economic evaluations. The MOEE policy for these hazardous substances suggests that special measures should be taken on a case by case basis, to minimize their release. From an environmental protection perspective, the application of pollution prevention principles, that is, avoiding the creation of the pollutants in the first place, is far more desirable than reliance on waste treatment. For these hazardous substances it is not appropriate to use the assimilative capacity of receiving waters and mixing zones to assist in establishing effluent limits.

2.4 MIXING ZONES

A mixing zone is defined as an area of water contiguous to a point source or definable non-point source where the water quality does not comply with one or more of the Provincial Water Quality Objectives. A mixing zone is, under no circumstances, to be used as an alternative to reasonable and practical treatment. It must be designed to be as small as possible. It is one factor to be considered in establishing effluent requirements.

The concept of mixing zones recognizes that the release of the aqueous component of adequately-treated municipal and industrial wastes to rivers, streams and lakes does occur. As a general principle, the dilution of such effluents, and thus the use of mixing zones, should be minimized and limited to conventional pollutants. The mixing zone principle does not apply to hazardous substances identified in Tables 1.7 and 1.8 of the MOEE report *Candidate Substances For Bans, Phase-Outs Or Reductions - Multimedia Revision.*

Conditions within a mixing zone must not result in irreversible environmental damage, risk to ecosystem integrity or risk to human health. Mixing zones cannot interfere with other water uses such as drinking water supply or recreation.

Terms and conditions related to a mixing zone will be designated on a case-by-case basis and may be specified in Certificates of Approval, Control Orders, Requirements and Directions, or approvals to proceed under the Environmental Assessment Act.

As effluent loading requirements are based on careful design, so too should mixing zones be carefully planned on a site-specific basis including consideration of water quality, seasonal streamflow and current patterns, physical factors, biotic communities and spawning areas in and adjacent to the mixing zone, nearby water uses such as bathing beaches and drinking water intakes as well as other wastewater discharges.

As general guidance in the design of mixing zones, the following range of concerns must be adequately addressed:

1) In order to protect important aquatic communities (fish, invertebrates and plants) in the vicinity of mixing zones, no conditions within the mixing zone will be permitted which:
   a) are acutely lethal to aquatic life;

b) cause irreversible responses which could result in detrimental post-exposure effects;

c) result in bioconcentration of toxic materials which are harmful to the organism or its consumer;

d) attract organisms to the mixing zones, resulting in a prolonged exposure;

e) create a barrier to the migration of fish or other aquatic life.

2) To ensure the protection of acceptable aesthetic conditions, mixing zones should not contain:

a) materials which form objectionable deposits (e.g. scums, oil or floating debris);

b) substances producing objectionable colour, odour, taste or turbidity;

c) substances which produce or contribute to the production of objectionable growths of nuisance plants and animals;

d) substances that render the mixing zone aesthetically unacceptable.

3) Mixing zones should not impinge upon existing municipal and other water supply intakes, bathing beaches or important fish spawning areas. Conversely, new intakes or aquatic recreation areas should not be constructed within the boundaries of existing mixing zones. However, with detailed knowledge of the effluent and receiver characteristics and the resulting conditions within the mixing zone, some mixture of uses might be permissible.

4) Mixing zones may overlap unless the combined effects exceed the conditions specified in this section.

5) When background water quality conditions at a proposed mixing zone site do not meet one or more of the Provincial Water Quality Objectives, effluent requirements should be established that ensure, at the very least, that background water quality is not further degraded.

2.5 EFFLUENT REQUIREMENTS

Although *Water Management* (1994) does not contain a specific policy related to establishing effluent limits, it does provide general guidance in the form of implementation procedures.

Substances that impair water and sediment quality are a major environmental problem. Many of these substances are toxic to aquatic life such as fish and aquatic invertebrates, in both the water column and sediment. Others are persistent and/or bioaccumulative and can cause food chain effects in fish, wildlife, birds and people who eat fish. Substances such as nutrients, when present in excess, can upset the natural balance of the ecosystem. Still others can impair the use of water by producing, for example, tastes and odours.

Polluting substances enter the water from many sources. Industrial and municipal discharges of wastewater, contaminated runoff from urbanized and agricultural areas, deposition of air pollutants, and lakefilling are all important sources of contaminants. Some of these substances, such as metals, are naturally occurring, and their presence in the water can often be the result of natural processes.

In establishing effluent requirements for discharges to surface waters, the process outlined below should be followed:

1) Appropriate site-specific receiving water assessments will be conducted to determine the effluent requirements based on the waste assimilative capacity of the receiver.

2) The site-specific effluent requirements, so derived, will be compared, where they exist, to the federal or provincial regulations or guidelines for effluent discharges and the most stringent requirement will be applied.

3) The effluent requirements derived from the above procedures, expressed as both waste loadings and/or concentrations, will be incorporated into a Certificate of Approval.

4) For existing discharges in areas with water quality worse than the Provincial Water Quality Objectives, the Ministry may develop a pollution control program with each discharger that would meet the effluent requirement determined from the above procedures.

Through the incorporation of receiving-water quality based limits into legally enforceable control documents like a Certificate of Approval, the guidelines for water quality management become enforced. These limits most commonly are for municipal or industrial point sources, but may also be applied to cooling water, stormwater or other polluting sources.

Chapter 3

DERIVATION OF EFFLUENT REQUIREMENTS

3.1 EFFLUENT LIMITS AND OBJECTIVES

Whether an effluent requirement is based on treatment-technology based or receiving-water based concerns, it may take the form of an effluent limit or an effluent objective, which are described as follows:

3.1.1 Effluent Limits

Effluent Limits are legally enforceable effluent requirements that are based on either achievable treatment technology or scientifically sound data on receiving water quality requirements, that is, the receiving water's waste assimilative capacity based on the Provincial Water Quality Objectives.

3.1.2 Effluent Objectives

Effluent objectives are used where the available data on the parameters to be controlled are insufficient to form the basis for a legally enforceable effluent limit. Violations of an effluent objective normally lead to a requirement for the discharger to undertake a study and report on the causes and impacts of the violations. This provides the basis for a decision by the MOEE on what corrective action is required to lessen effluent impact on the receiver, either through negotiation with the discharger or the issuance of a Control Order.

3.2 CERTIFICATES OF APPROVAL AND OTHER REGULATORY INSTRUMENTS

Many of the older Certificates of Approval for both industrial and municipal point sources approve the installation of effluent treatment systems but do not set effluent requirements or monitoring or reporting requirements. More recent Certificates (and Control Orders) include effluent requirements and usually include monitoring and reporting requirements.

The MOEE presently sets effluent requirements on a discharger-specific basis. A variety of measures are used by the MOEE to apply these requirements, including voluntary programs or guidelines, Control Orders, Certificates of Approval and other MOEE requirements and directions. The MISA effluent limits regulations are designed to set uniform, legally enforceable, sector-specific limits for each direct discharger in specific industrial sectors. The Ministry will continue to expect industrial dischargers to meet all the existing treatment technology-based numerical requirements (including guidelines) until replaced by the MISA limits regulations.

3.3 EFFLUENT LOADINGS AND CONCENTRATIONS

Many point sources now have requirements set on a loading basis (e.g. kilograms discharged per day) as well as on an effluent concentration (e.g. mg/L) basis. This recognizes that the loadings of pollutants to the environment are as important, if not more so, than effluent concentrations for some toxic contaminants, especially those that persist in the receiving waterbody.

3.4 TYPES OF CONTAMINANTS

In the past, the majority of effluent requirements were set for the traditional indicators of environmental quality (conventional pollutants), including BOD, suspended solids, total phosphorus and kjeldahl nitrogen. While these traditional indicators continue to be used, Certificates of Approval may now also specify effluent requirements for an assortment of toxic contaminants.

3.5 TREATMENT TECHNOLOGY- BASED EFFLUENT REQUIREMENTS

Treatment technology-based effluent requirements are contained in a range of provincial and federal acts, regulations, guidelines and policies. A listing is provided in Appendices A and B of this report.

On a case-by-case basis, MOEE technical staff may apply professional judgement to develop treatment technology-based effluent requirements if no provincial or federal regulations, guidelines or policies exist.

Originally, for industrial point-source discharges, a concentration-based approach was incorporated into provincial effluent requirements on the basis of experience with municipal sewage treatment systems. It was presumed that where industry used the same effluent treatment technology as the municipalities, both effluents should have similar pollutant concentrations. However, many industrial wastewater effluents have different characteristics than municipal wastewaters, and the use of similar effluent treatment systems does not produce similar pollutant concentrations. Subsequently, other guidelines were developed for specific industrial sectors and are based on the state of treatment technology for those sectors at the time of writing the effluent requirement.

Chapter 4

DERIVING RECEIVING-WATER BASED EFFLUENT REQUIREMENTS

4.1 INTRODUCTION

Before any discharger-specific effluent requirements are specified in a Certificate of Approval or other legal instrument, Ministry staff review the impact of the treatment technology-based effluent on the receiving water body.

For contaminants which are not considered to be designated hazardous contaminants, every river, stream or lake has a definable assimilative (self-purification) capacity. Water quality considerations take precedence when contaminant discharges exceed the assimilative capacity of the receiving waters, even if the discharged loadings are within the treatment technology based effluent requirements based on the guidelines, regulations or policies. Receiving-water based effluent requirements also take precedence when ambient levels of toxic contaminants are above acceptable levels. The procedures for determining the receiving-water based effluent requirements are described below.

4.2 APPLICABILITY

Receiving-water based Effluent Requirements are developed within the following policy framework:

> *"The surface waters of Ontario are put to many uses, and each use has specific water quality requirements. As a general management principle, water quality must be protected, preserved or restored to permit the greatest number of uses, based on the best interests of the people of Ontario"* (Water Management, 1994).

To this end, the goal of the Ministry of Environment and Energy is:

> *"to ensure that the surface waters of the province are of a quality which is satisfactory for aquatic life and recreation"* (ibid).

To support this goal, the Ministry's policy further states that:

> *"... the PWQO are set at a level of water quality which is protective of all forms of aquatic life and all aspects of the aquatic life cycles. The clear intention is to protect all life stages during indefinite exposure to the water"* (ibid).

Other key principles for developing receiving water-based Effluent Limits were outlined in earlier sections of this report.

It should be reiterated that the emphasis of the implementation procedures outlined in this report is the control of point source discharges to the surface waters of Ontario. Control of non-point discharges and pollutants from atmospheric deposition are equally important but not addressed in this document.

4.3 RESPONSIBILITY

The discharge proponent is responsible for assessing the assimilative capacity of the receiving water body and to derive from this assessment the receiving-water based effluent requirements. The receiving-water based effluent requirements must be confirmed by staff of MOEE Regional Operations Division. This is done during the Pre-Application Consultation. The Pre-Application Consultation is detailed in MOE reports *Guide for Applying for Approval of Industrial Sewage Works* (MOE, 1992b) and *Guide for Applying for Approval of Municipal and Private Sewage Works (MOE, 1992c).*

4.4 WATER QUANTITY CONSIDERATIONS

In the development of effluent requirements, the first determination made is the flow/assimilative capacity of the receiving-water body. Effluent requirements are established to maintain set dilution ratios based on the flow in the receiving stream or allowed concentrations, after mixing, of selected contaminants in the receiving water body. Separate procedures are outlined for rivers and streams, and lakes and interconnecting channels.

4.4.1 Discharges to Rivers/Streams

For continuous point source discharges, the low flow statistic 7Q20 (the minimum 7 day average flow with a recurrence period of 20 years - i.e. a 5% chance of there being inadequate streamflow to meet the minimum acceptable dilution in any given year) is used as the basic design flow for the receiving stream. This value can be calculated from data collected by the Water Survey of Canada or from publications like the Ontario Ministry of Environment and Energy report *Low Flow Characteristics in Ontario* (MOE, 1989).

For **non-continuous** point source discharges, ideally, the 7Q20 for the specific discharge period is used as the basic design flow for the receiving water body. However, the hydrology of Ontario varies tremendously from region to region and, for this reason, the low-flow statistic used for seasonal discharges often must be determined on a site and condition-specific basis. The quantity and quality of effluent to be discharged, along with physical discharge considerations, makes selection of a single statistical method difficult. Likewise, in rivers which are only suitable for seasonal discharges, the hydrological characteristics of the receiving waters do not lend themselves to a uniform statistical approach. For these reasons, the selection of appropriate seasonal low flow design criteria and the approach used to pro-rate streamflow information from a gauging station to the proposed discharge location is based on the judgement of Ministry staff.

For either continuous or non-continuous discharges, if sufficient streamflow data are not available, one or more seasons of gauging may be required to develop a correlation between the selected location and other gauging location(s) with a long term record.

Special Discharge Situations

Discharges rated proportionally to streamflow may be permitted when assimilative studies indicate the need and when storage or discharge volumes and/or quality can be controlled. Effluent requirements are stipulated to maintain set dilution ratios based on the flow in the receiving stream or allowed concentrations of selected variables (based on stream sensitivity) in the receiver after mixing. *See Derivation of Effluent Criteria for Certificates of MOE* (MOE 1992d). The proponent may be required, as a condition of the Certificate of Approval, to install, maintain and operate a continuous recording streamflow gauge which meets the Water Survey of Canada's national standards as described in *Standard Operations Manuals* (Environment Canada).

Discharges to dry ditches (watercourses that go dry seasonally) may be permitted in some instances. Additional assessments may be required to confirm that the discharge will not impact aquatic life or other water uses downstream where there is a continuously flowing stream (MOE 1992d).

Reserve Capacity

In addition to the guidance above, in some cases, a portion of the assimilative capacity of the river can be reserved in anticipation of future needs.

4.4.2 Discharges to Lakes and Interconnecting Channels

Discharges directly to a shoreline are not acceptable for new or expanded waste water discharges. A shoreline discharge of storm water and/or cooling water may be considered on a case-by-case basis.

In the Great Lakes, initial mixing for discharge diffusers in lakes must have a minimum near field (initial mixing) ratio of 20:1. Specification of additional site-specific conditions (e.g. spawning shoals, beaches, drinking water intakes, minimum depth of submergence and distance offshore, etc.) are based on the professional judgement of MOEE staff.

Proposed discharges to inland lakes are assessed on a case-by-case basis. Proposed phosphorus discharges to inland lakes are assessed using the *Lakeshore Capacity Study: Trophic Status Model* (MOE, 1986).

The impact of a point source discharge to a lake or interconnecting channel can be minimized by optimizing the design and location of the discharge diffuser. Factors affecting the dilution efficiency of the diffuser (e.g. variation in the initial dilution between start-up flows and ultimate flows, buoyant versus non-buoyant plumes, current speeds) are considered in determining the impact of the point source discharge.

4.4.3 Procedures for the Taking and Discharging of Cooling Water

Method of Removal

The design and location of the water intake must be such that entrainment of fish, including larval fish and eggs, and other aquatic life is minimized. Scientific studies must demonstrate to the satisfaction of the MOEE that the intake design and location are optimal for minimizing entrainment. These studies will be required for each intake that will draw in excess of 10 m^3/sec. The MOEE reserves the right to require these studies for intakes of lower capacity, particularly for intakes from inland waters.

Method of Disposal

Discharge of waste heat shall be into such areas and locations and in such quantities as may be allowed by the MOEE on a case-by-case basis. The method of discharge shall be such that rapid mixing occurs with the receiving water, thus minimizing the area affected. Scientific studies must demonstrate to the satisfaction of the MOEE that the discharge design and location are optimal for minimizing the area affected by the discharge and the environmental impact of the discharge. These studies will be required for each discharge with a capacity greater than 10 m^3/second. The MOEE may require these studies for discharges of lower capacity, particularly for discharges to inland waters. A discharge of waste heat should not affect the water temperature of any water intake or fish spawning area.

Contaminants in Discharge Water

The use of cooling water for waste disposal shall be minimized. Such waste as may be permitted to be disposed of in this manner shall be at such levels as determined by application on a case-by-case basis to the MOEE. Substances used as biocides in condenser cleaning will only be permitted in the cooling water at residual levels to be approved by the MOEE on a case-by-case basis.

Alternative Cooling Facilities

In those instances where significant effects can be clearly predicted, alternative cooling facilities are to be employed. In those instances where potential harmful effects may arise, but cannot be clearly predicted, generating stations should be initially designed so that alternative cooling facilities can be added at such time as evidence indicates sufficient adverse effects.

Circulation Patterns

The taking and discharge of cooling water and structures built for these purposes shall not alter the local existing circulation patterns such that other water uses, sedimentation, spawning or fishing grounds are adversely affected.

Beneficial Uses

Wherever possible, all or part of the waste heat discharge shall be used in a beneficial way.

4.5 WATER QUALITY CONSIDERATIONS

Another important determination made in developing receiving-water based effluent requirements is background physical, chemical and biological conditions.

Background water quality conditions, where available, are considered in the development of receiving-water based effluent requirements for Certificates of Approval. Although more than one method is used to determine the appropriate background concentration depending on the MOEE Region involved, the following common factors are considered when selecting an appropriate background value for these assessments:

- number of analyses and period of record;
- variability of the database;
- validity and integrity of the values or record available;
- potential hazard of each contaminant or parameter;
- potential for bioaccumulation of each contaminant.

Seasonal and/or diurnal changes or fluctuations (e.g. temperature, dissolved oxygen, pH) are considered when establishing background conditions. Normally the 75th percentile is used to determine background quality, but with proper justification this value may be modified based on stream sensitivity and the above-mentioned considerations. Further details are contained in *Streamlining the Approval of Discharge Criteria to Surface Water* (MOE 1992e).

Background determinations usually employ the entire database to determine the appropriate value for each variable assessed. Outliers in the data base may be eliminated, but justification for this must be presented. In cases where water chemistry may have changed due to land-use changes or improved control of discharges, the period of record may be reduced to reflect present conditions. Integration of all these variables and the final determination of background water chemistry conditions, involves an element of professional judgement by Ministry staff.

MOEE has a broad range of monitoring databases available to assist in determining background water quality and contaminants of concern. Some of the more important monitoring databases include:

- Provincial Water Quality Monitoring Network
- MISA monitoring data
- Industrial and Municipal Discharger Reports
- Drinking Water Surveillance Program
- Great Lakes investigation and surveillance
- Young-of-the-year fish - contaminants monitoring
- Sports Fish Contaminants Monitoring Program

- Other biomonitoring programs
- Existing site-specific assessments
- Regional studies

Industrial and municipal point source discharges are assessed for the major contaminants identified by the proponent in a waste water characterization study or for those contaminants expected to be in the effluent based on specific knowledge of the plant process and site-specific conditions of the receiving stream.

At a minimum, all municipal and private domestic sewage discharges are evaluated for the following variables: suspended solids, BOD_5, total phosphorus, ammonia and chlorine residual (MOE, 1992e). Any waste water treatment plant that receives industrial discharges should also have a wastewater characterization study (e.g. metal scans) performed to confirm that there are no additional variables of concern. Where the amount of ammonia discharged is environmentally insignificant compared to the assimilative capacity of the receiving stream, effluent requirements for this contaminant are optional.

Based on the information noted above, Ministry staff determine the contaminants for which Effluent Requirements will be specified.

4.6 ASSESSMENTS PRIOR TO START-UP OR EXPANSION

Prior to submitting an application for approval to discharge or to expand an existing discharge, a receiving water assessment report is required. When only minimal information on receiving water conditions is available, or if there is concern that appropriate protection of the biota may not be achieved, given the available information used to derive the effluent requirements, then additional water quality assessments may be required after start-up or expansion. The assessments may incorporate water quality/quantity, biological and sediment surveys.

Provincial Water Quality Objectives maybe employed prior to start-up or expansion by project proponents to pre-screen proposed discharge locations. In this way, sites can be selected where the environmental impact of the discharge will be minimized.

4.7 SPECIFICATION OF EFFLUENT REQUIREMENTS BASED ON RECEIVING WATER CONDITIONS

Prior to specifying any receiving-water based effluent requirements in a Certificate of Approval, a number of receiving-water related conditions must be established. These are the mixing zone, contaminants of concern, policy status of the receiver (i.e Water quality better than the Objectives or Water quality not meeting the Objectives) and other water uses. These conditions are discussed below:

4.7.1 Mixing Zone Requirements

The size of and water use within mixing zones are considered on a case-by-case basis depending on the local water quality conditions and water use, along with the contaminants of concern in the discharge. The derivation frequently involves the use of site-specific models to determine the extent of mixing zones. In a simple scenario, this is done by applying the Provincial Water Quality Objective at the edge of the mixing zone as the desirable level of water quality. The allowable effluent requirement needed to meet the Provincial Water Quality Objective at the edge of the mixing zone can then be back-calculated. More complicated scenarios require more complex assessments and techniques.

Dischargers are required, where appropriate, to submit a proposed wasteload allocation for the discharge facility based on the entire watershed and the up- and downstream water users (MOE. 1992b; MOE. 1992c). This information is used to assist in defining the allowable mixing zone.

Occasionally, situations arise in which the close proximity of dischargers on a common receiver presents a unique problem for apportioning the assimilative capacity of the receiver and defining the mixing zones. Use of sophisticated modelling techniques such as those documented in the *MISA St. Clair River Pilot Site Investigation* (MOE 1991a) may be necessary in these situations.

4.7.2 Contaminants to be Considered

Based on the chemical use inventories submitted by the proponent with the application for Certificate of Approval (MOE. 1992b; MOE. 1992c) and on MOEE staff knowledge of the contaminants expected in the effluent, a list of contaminants to be controlled is developed.

4.7.3 Existing Receiving Water Quality

The discharge proponent is responsible for collecting background information and determining, during the Pre-application Consultation with staff from MOEE's Regional Operations Division, whether Surface Water Quality Policy 1 or Policy 2 (MOEE, 1994) applies to each of the contaminants on the expected list. MOEE staff will rely upon available MOEE data and site-specific knowledge of the receiving water quality to guide the proponent in this determination. A determination will also be made on the level and type of treatment required beyond that specified by the treatment technology-based requirements. MOEE's Regional Operations Division must confirm the proponents determination prior to submission of the application for Certificate of Approval (MOE, 1992b; MOE, 1992c).

<u>Ambient Water Quality Better Than the PWQOs (Policy 1)</u>

In a Policy 1 situation, an evaluation is made as to what treatment or other measures are required to maintain water quality at or above the Provincial Water Quality Objectives.

Although some lowering of water quality is permissible, violation of the Provincial Water Quality Objectives is not allowed.

Ambient Water Quality Worse than the PWQOs (Policy 2)

In a Policy 2 situation, no further lowering of water quality is permitted, and all practical measures must be undertaken to upgrade water quality.

In exceptional cases described in Section 2.2 of this document, a proponent may make a formal application for a deviation from these requirements using a prescribed format (Appendix C). After review by appropriate MOEE staff, a deviation may be approved by the Ministry.

Other Water Uses

Occasionally, other downstream water uses such as irrigation or drinking water supply are identified. For the few contaminants, where better water quality is required to protect these other beneficial uses in a given location, the appropriate water quality criteria are used to assess the discharge at that location.

Any potential impacts on the ground water aquifer must be reported in the application for Certificate of Approval (MOE 1992f; MOE 1992g). This information is assessed by MOEE staff to determine appropriate requirements.

4.8 SPECIFYING RECEIVING WATER BASED EFFLUENT REQUIREMENTS IN CERTIFICATES OF APPROVAL

This section describes the development of receiving-water based effluent requirements which complement the treatment technology-based effluent requirements.

Once the extent of the mixing zone, the contaminants of concern, background receiving water quality and appropriate water uses are determined, the receiving-water based effluent requirements can be specified for the Certificate of Approval.

4.8.1 Types of Requirements

The following types of receiving-water based effluent requirements may appear in the Certificate of Approval:

Effluent Requirements Based on the Results of the Mixing Zone Evaluations and Policy Assessment

Receiving water based Effluent Requirements are established for contaminants where required. The results of both the mixing zone evaluations and the policy assessment are integrated to set an appropriate effluent requirement. These requirements can be in the form of either an Effluent Limit or Objective.

Whole Effluent Toxicity Requirements

All new or expanded effluent discharges must not be acutely lethal as defined by meeting a 96 hour LC_{50} whole effluent toxicity test using Rainbow trout and *Daphnia magna*. These requirements can be in the form of either an Effluent Limit or Effluent Objective.

Biological Effluent Requirements Based on the Survival, Health and Diversity of In-situ or Resident Biota

Biological Effluent Requirements are occasionally specified. They are usually specified as Effluent Objectives, and are frequently referred to as Biological Effluent Objectives. In most cases, Biological Effluent Objectives defined in Certificates of Approval require some type of in-stream biological monitoring to be conducted (e.g. benthic enumeration). After start-up, failure to maintain biological conditions, as specified in the Certificate of Approval as an Effluent Objective, requires studies to be done to determine the cause of the change in or loss of aquatic biota. For example, the use of aquatic invertebrate data may provide an indication of the minimum water quality conditions that have occurred in the stream over the life-cycle of the species found. This information may then be used to define the background conditions, which can then be contrasted with the post-discharge condition of the receiving water body.

4.8.2 Some Additional Receiving-Water Based Considerations

Surface Water Quality Management Policy 3 prohibits the discharge of hazardous substances that have been banned and Policy 4 recommends that special measures be taken to minimize the release of hazardous substances that have not been banned. (*Water Management. 1994*)

Inventories of raw materials, products, by-products and wastes of the discharger, the use and fate of all other chemicals used in the process which may contaminate the wastewater, cooling and storm water stream water characteristics, and effluent concentrations for all design parameters, *Effluent Monitoring Priority Pollutants List* (MOE, 1987) substances and parameters for which a regulated limit exists must be submitted with the application for Certificate of Approval. Full details of these requirements are provided in MOE reports referenced in this document as MOE. 1992b and MOE, 1992c. Specification of additional control measures for these substances is left to the judgement of MOEE staff.

Prior to the construction or major upgrading of a STP, a full Class Environmental Assessment must be carried out to evaluate the plant's impact on the environment. Possible alternatives and their impact on the environment are also reviewed. As part of the environmental assessment process, the effluent requirements based on the assimilative capacity of the receiving water are considered. When a decision is made on the results of the environmental assessment, funding requirements and approval to expand must be obtained from the local Municipal Council and the MOEE before detailed design and construction can begin. The effluent concentration and/or loading requirements

established during the environmental assessment process are stipulated in the Certificate of Approval.

Discharges to dry ditches (watercourses that go dry seasonally) may be permitted in some instances. In these cases, best available technology and a non-acutely lethal effluent are required. Typical best available treatment technology-based effluent are: BOD_5 10 mg/L, suspended solids 10 mg/L, total phosphorus 0.3 to 0.5 mg/L, total ammonia 1 to 3 mg/L and chlorine absent (MOE, 1992e). Additional assessments may be required to confirm that the discharge will not impact aquatic life or other water uses downstream where there is continuous stream flow (i.e. the secondary receiver).

Chapter 5

EFFLUENT REQUIREMENTS AND ENFORCEMENT

5.1 EFFLUENT LIMITS

Effluent Limits stipulated in Certificates of Approval and other legal instruments are legally enforceable requirements that are based on either achievable treatment technology or discharger specific ambient water quality requirements (e.g. Provincial Water Quality Objectives).

5.1.1 Assessment of Compliance

All limits (concentrations, loadings and hydraulic flows) on a Certificate of Approval or other legal instrument must be met individually. Non-compliance of either the concentration, loading or hydraulic flow limits stipulated in the Certificate of Approval or other legal instrument is a violation and is grounds for enforcement and prosecution.

The violation of legally enforceable Effluent Limits in Certificates of Approval, Control Orders, and federal and provincial regulations may result in prosecutions.

For municipal point source discharges (STP), those contaminants, for which limits are not specified in a Certificate of Approval, are assessed using the MOEE Treatment Technology Based Policies Related to Municipal Wastewaters (Appendix B).

In the case of industrial point source discharges, there are a number of reasons why a company may be out of compliance. These vary from isolated incidents (for example, breakdowns of equipment, operating or laboratory errors which are either one-time occurrences or are corrected at the time), to basic deficiencies in treatment capability. The former can occur at any time. The latter, however, may result in continuing non-compliance, since equipment changes or modifications are usually required to improve treatment effectiveness, changes which can take considerable time.

For municipal point source discharges (STP), remedial measures are required by MOEE for non-complying STPs in order to improve their performance. Non-compliance may be due to such things as: design and operational problems or abnormal incidents such as industrial spills in the sewerage system.

For point-source discharges, any major plant operational problems or environmental degradation are documented by MOEE Regional field staff in an Occurrence Report.

5.1.2 Definition of Compliance

Effluent Limits only become legally binding when included in control documents. To assist in defining compliance with Effluent Limits, Non-Compliance Criteria are specified.

These are narrative requirements which describe sampling frequency, sampling protocol, etc. These are necessary to determine if a violation of an Effluent Limit has taken place. For full details of compliance, see MOEE Guideline F-2, Compliance (MOEE, 1994b).

5.1.3 Abatement

Where appropriate, abatement measures are used to bring about compliance, usually focused directly on the prevention, reduction and elimination of pollution. Specific criteria for judging when abatement actions are appropriate are detailed in the MOEE Guideline F-2, Compliance (MOE, 1994b).

Industrial point source discharges and municipal STPs must undertake abatement action following orders issued by the Ministry. These actions can often take several years to complete, because of the time required for identification of the problem, analysis of remedial options, selection of an option, purchase of equipment, delivery, installation, and start-up. In some cases there may be a "quick fix". Often, however, a combination of process and equipment changes are required.

The MOEE Regional Abatement Offices provide assistance to dischargers in developing action plans which will bring the dischargers into compliance.

5.1.4. Enforcement and Prosecution

As noted previously, for point-source discharges, any major plant operational problems or environmental degradation are documented by MOEE Regional field staff in an Occurrence Report.

Once an Occurrence Report is filed and if further investigation by the Investigations and Enforcement Branch (IEB) of the MOEE is recommended, then the IEB is alerted. Following an investigation, charges may or may not be laid, based on informed judgement. Violation of a requirement does not necessarily mean that charges are laid. An abatement action may be carried out instead.

The MISA program will address the issue of uniform, legally enforceable limits for industrial point sources, initially in the nine major industrial sectors, by setting Effluent Limits and compliance dates.

5.2 EFFLUENT OBJECTIVES

For some situations, the available discharger-specific information may be insufficient to form the basis for a legally enforceable Effluent Limit. In such cases, Effluent Objectives are specified. Rather than serving as a basis for prosecution, violations of an Effluent Objective normally lead to a requirement for the discharger to undertake a study and report on the causes and impacts of the violation. This provides the basis for a decision by the MOEE on what corrective action is required to lessen effluent impact on the

receiver, either through negotiation with the discharger or the issuance of a Control Order.

Requirements for Biological Objectives may also be included in a Certificate of Approval where some type of biological monitoring is appropriate. Failure to maintain specified biological conditions or specific criteria usually triggers a requirement for further studies to determine the cause of the change or loss. These types of biological monitoring requirements are normally added to the Certificate of Approval by MOEE Regional staff familiar with the site-specific conditions which may warrant such requirements.

5.3 CONTROL ORDERS

Violation of the Effluent Limits or Effluent Objectives may result in the issuance of a Control Order. This legally enforceable instrument, which defines abatement actions with compliance dates, and which may be issued to any existing plant, are based on Section 7 of The Environmental Protection Act. Legally enforceable Requirement and Direction may also be issued under Section 53 of The Ontario Water Resources Act.

Control Orders and Requirement and Direction may be appealed and the requirements in question do not apply during the appeal period (i.e. the discharger can continue to operate, without improving effluent quality). Since appeals are time consuming and no effluent improvement can be expected to occur during the appeal period, a consensus is often negotiated by the discharger and the MOEE before the control document is issued. This compromise achieves some immediate effluent improvement.

5.4 ASSESSMENTS AFTER PLANT START-UP

An assessment may be required as part of the Certificate of Approval after plant start-up when minimal information was provided with the application for Certificate of Approval, or there is concern that appropriate protection of the receiving water body may not be achieved given the information used to derive the Effluent Requirements. The Certificate of Approval may specify any milestones and/or triggers that may be required (plant closure, forced process upgrade, etc.) for the remediation.

5.5 FOLLOW-UP MONITORING

Both effluent and ambient water quality monitoring requirements may be specified in the Certificate of Approval. Monitoring results are used to determine if protection of the receiving water body is actually being achieved and that the treatment facilities are operating efficiently (as designed or approved).

Chapter 6

GLOSSARY

Assimilative capacity - the limit of a waterbody to transform and/or incorporate substances (e.g. nutrients) by the ecosystem, to the point that water quality does not degrade below a predetermined level.

Background Water Quality - The biological, chemical and/or physical conditions of a water body measured at a point upstream of the influence of the discharge or other pollution source The establishment of natural background for an altered water body may be based upon a similar unaltered water body or on historical pre-alteration data.

Certificate of Approval (C of A) - A legal document issued, at a proponent's request, by a Designated Director of the Ministry of Environment and Energy under the authority of the Ontario Water Resources Act. C of A's may include effluent requirements and monitoring requirements.

Compliance - A state achieved by adherence to the legislative and regulatory requirements of the Ontario Ministry of Environment and Energy. These requirements cover a wide range of activities, from the prevention, reduction and elimination of pollution, to the obtaining of approvals and licences, to the completion of routine paperwork and the filing of reports.

Contaminant - A substance which, once in the water, may pose a threat to the ecosystem and/or human health, as well as uses such as water supply, recreation, and aesthetic conditions.

Control Order - A document that requires the discharger to take specific action with an associated deadline. It is authorized by statute, binding upon the recipient, and directly enforceable by prosecution.

Conventional Pollutants - Traditional indicators of environmental quality including BOD, nutrients and solids. Materials defined as hazardous substances are not included in this category.

Effluent Limits - legally enforceable effluent requirements that are based on either achievable treatment technology or site-specific receiving water quality requirements (e.g. Provincial Water Quality Objectives).

Effluent Objectives - A form of effluent requirement used where the available data on the parameter to be controlled may be insufficient to form the basis for a legally enforceable Effluent Limit. Violations of an Effluent Objective normally lead to a requirement for the discharger to undertake a study and report on the causes and impacts

of the violations. This provides the basis for a decision by the MOEE on what corrective action is required to lessen effluent impact on the receiver, either through negotiation with the discharger or the issuance of a Control Order.

Hazardous Substances - chemicals that are persistent, bioaccumulative and extremely toxic. They including substances which, individually or in combination with other substances, can cause death, disease including cancer, behavioural abnormalities, genetic mutations, physiological malfunctions and/or physical deformities.

Mixing Zone - an area of water contiguous to a point source, where a limited range of exceptions to water quality objectives and conditions, otherwise applicable to the receiving water, may be granted.

Non-Compliance (Effluent) Criteria - narrative requirements which describe sampling frequency, sampling protocol, etc. necessary to determine when a violation of an Effluent Limit or Objective has taken place.

Non-point Source - A non-specific or diffuse source entering the aquatic environment . Commonly, any source that cannot be described as a point source. Usually, this type of source is not amenable to collection and, if necessary, treatment.

Point source - A source of pollution that is discharged to the environment at a specific location. It is quantitatively and qualitatively definable.

Provincial Water Quality Objective - Numerical or narrative criteria representing a desirable level of water quality for the protection of aquatic life and recreation.

Site-specific - Conditions and requirements defined by the unique characteristics of a particular geographical location.

Water Quality Criteria - a designated concentration or characteristic of a constituent or attribute of water based on scientific judgements that, when not exceeded, will protect an organism, a community of organisms, or a prescribed water use with an adequate degree of safety. In Ontario, these are known as Provincial Water Quality Objectives.

Violation - A contravention of any act or regulation administered by the Ministry of Environment and Energy.

Chapter 7
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MOE. 1992c. *Guide for Applying for Approval of Municipal and Private Sewage Works.* Ontario Ministry of the Environment, Approvals Branch.

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MOEE. 1994b. *MOEE Manual of Guidelines and Procedures.*

MOEE. 1994c. *Ontario's Provincial Water Quality Objectives.*

APPENDIX A

TREATMENT TECHNOLOGY-BASED PROVINCIAL AND FEDERAL REGULATIONS, GUIDELINES AND POLICIES RELATED TO INDUSTRIAL WASTEWATER

MINISTRY POLICIES, REGULATIONS AND GUIDELINES RELATED TO INDUSTRIAL WASTEWATER

1. Objectives for the Control of Industrial Waste Discharges in Ontario
2. Minimum Objectives for the Control of Industrial Waste Discharges in Ontario, April, 1982
3. Mineral Industries Information Sheet
4. Guidelines for Environmental Control in the Ontario Mineral Industry, October 1981
5. Aquaculture in Ontario (Fish Farms), 1986, MOE, MNR, MAF
6. Guidelines for the Appraisal of Gravity-Type (API) Oil/Water Separators
7. Guidelines for the Design of Water and Sewage Treatment Works, 1984
8. Water Management - Policies, Guidelines and Provincial Water Quality Objectives of the Ministry of Environment and Energy, 1994
9. MOEE Manual of Guidelines and Procedures, 1994
10. Annual Industrial Dischargers Report
11. Generic Conditions for Industrial and Municipal Sewage, May 1990
12. Public Consultation Resource Kit for Ministry Staff
13. An Outline of the Information Required for the Preparation of a Hearing Brief under Sections 25 and 26 of the Ontario Water Resources Act for the Environmental Assessment Board

14. Guidelines for Financial Assurance: (Part X-A), Ontario Environmental Protection Act, February 1988

15. MISA General and Sectoral Monitoring Regulations

16. Guidelines for the Decommissioning and Clean-Up of Sites in Ontario, January 1989

17. Guidelines for Environmental Protection Measures at Chemical Storage Facilities, October 1978

18. Guidelines on Applying for the Approval of Water and Sewage Works to Deal with Zebra Mussel Control, May 1990 (revised)

19. Guidelines for the Handling and Disposal of Selected Liquid Wastes from Automotive Service Stations, December 1985

20. The Incorporation of the Reasonable Use Concept into the Groundwater Management Activities of the Ministry of the Environment, September 1986

21. Registration Guidance Manual for Generators of Liquid Industrial and Hazardous Wastes

22. Guidelines on the Preparation of Applications under Section 24, the Ontario Water Resources Act

23. Guidelines for the Use of Chlorine, $S0_2$, and Ammonia in Water and Sewage Treatment Plants in the Province of Ontario, February 1987

24. The Ontario Water Resources Commission Guidelines for Embankment Retention Systems for Waste Slurries

25. Information Required for Pumping Station Applications

26. Manual for Computer Storage and Retrieval of Indexing Information of Certificates of Approval, January 1986

27. Draft Guideline for the Use of Ultra-Violet (UV) Irradiation Process for Sewage Effluent Disinfection, October 1988.

FEDERAL POLICIES, REGULATIONS AND GUIDELINES RELATED TO INDUSTRIAL WASTEWATER

1. Canadian Environmental Protection Act - S.C. 1988, c. 22, as amended
2. Fisheries Act - R.S.C. 1970, c. F-14, as amended

Regulations and Guidelines under the Fisheries Act

a. Chlor-Alkali Mercury Liquid Effluent Regulations - C.R.C. 1978, c. 811, No. 5 - September 1983

b. A Code of Good Housekeeping Practise for the Metal Finishing Industry - November 1977

c. Existing Metal Mining Effluent Guidelines

d. Existing Petroleum Refinery Liquid Effluent Guidelines (Quality of Liquid Effluents) - January 1974

e. Fish Processing Operations Liquid Effluent Guidelines - June 1975

f. Meat and Poultry Products Plant Effluent Guidelines

g. Meat and Poultry Products Plant Liquid Effluent Regulations - C.R.C. 1978, c. 818

h. Metal Finishing Liquid Effluent Guidelines

i. Metal Mining Liquid Effluent Guidelines

j. Metal Mining Liquid Effluent Regulations - C.R.C. 1978, c. 819

k. Petroleum Refinery Liquid Effluent Guidelines (Acute Toxicity of Liquid) - 1974

l. Petroleum Refinery Liquid Effluent Regulations - C.R.C. 1978, c. 828

m. Potato Processing Plant Effluent Guidelines - July 13, 1977

n. Potato Processing Plant Liquid Effluent Regulations - C.R.C. 1978, c. 829

o. Guidelines for Pulp and Paper Effluent Regulations - May 1972

p. Pulp and Paper Effluent Regulations - C.R.C. 1978, c. 830

q. Toxicity Guidelines for Potato Processing Plants - July 1977

APPENDIX B

TREATMENT TECHNOLOGY BASED GUIDELINES RELATED TO MUNICIPAL WASTEWATER

From the *MOEE Manual of Guidelines and Procedures* (MOEE, 1994b):

Guideline F-5

Levels of Treatment for Municipal and Private Sewage Treatment Works Discharging to Surface Waters

F-5-1 Determination of Treatment Requirements for Municipal and Private Sewage Treatment Works Discharging to Surface Waters

F-5-2 Relaxation of Normal Level of Treatment for Municipal and Private Sewage Treatment Works Discharging to Surface Waters

F-5-3 Derivation of Sewage Treatment Works Effluent Requirements for the Incorporation of Effluent Requirements into Certificates of Approval for New or Expanded Sewage Treatment Works

F-5-4 Effluent Disinfection Requirements for Sewage Works Discharging to Surface Waters

Guideline F-8

Provision and Operation of Phosphorous Removal Facilities at Municipal, Institutional and Private Sewage Treatment Works

F-8-1 Determination of Phosphorus Removal Requirements for Municipal, Institutional and Private Sewage Treatment Works

Guideline F-10

Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only)

F-10-1 Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only)

APPENDIX C

GUIDELINES FOR HANDLING REQUESTS FOR DEVIATIONS FROM MOEE SURFACE WATER QUALITY MANAGEMENT POLICY 2

The general basis for considering a deviation from Surface Water Quality Management Policy 2 is outlined in *Water Management* and states, in part:

"... in exceptional cases, where it is clearly demonstrated that all reasonable and practical measures to attain the Provincial Water Quality Objectives have been undertaken but where:

1) the Provincial Water Quality Objectives are not attainable because of natural background water quality; or

2) the Provincial Water Quality Objectives are not attainable because of irreversible man-induced conditions; or

3) to attain or maintain the Provincial Water Quality Objectives would result in substantial and widespread adverse economic and social impact; or

4) suitable pollution prevention techniques are not available;

then deviations from this policy may be allowed, subject to the approval of the Ministry of Environment and Energy."

The following procedures have been developed to process requests for deviations from Policy 2.

C.1 General Procedures

The Request for Deviation from Policy 2 should be requested by the MOEE Region, based on either:

- a request by a proposed discharger to the Regional Office, or

- a determination by the Region that consideration of a deviation may be the appropriate course of action.

A standardized format has been developed to document the Request for Deviation and ensure that appropriate information is presented upon which to evaluate the request. The information requirements and layout of the form are described in C.2.

The form is in three parts with the first part to be completed by the Region, the second by the Approvals Branch and the third by the Program Development Branch. Once the Region has completed Part 1, copies should be forwarded to the Approvals Branch and the Program Development Branch. The Approvals Branch should complete Part 2 of the form and forward the results to the Program Development Branch who will be responsible for evaluating all of the information supplied and coordinating the response to the Request for Deviation.

Once the Director of the Program Development Branch approves or denies the proposed deviation and signs the form, it is forwarded to the Regional Director for concurrence and signature. Where approval is given, the original copy of this form is filed by the MOEE with the original copy of the Certificate of Approval.

C.2 Information Requirements for a Deviation Request

Part 1

(To be completed by the MOEE Region)

Basic Information

Identification of the proponent, including:
- name
- proponent's office address

Identification of the proponent's consultant, including:
- name of consulting firm
- address
- telephone and Fax number
- contact person

Identification of receiving waterbody and the proposed point of discharge, including:
- official name of waterbody directly receiving the discharge (from the Ontario Gazette or topographic map)
- location (lot, concession, township, latitude and longitude)
- Copy of the appropriate section of a topographic map to scale of 1:50,000 or larger showing the receiver and the specific point of discharge. The map name and number should be indicated (e.g. Temagami 31 M/4)

Identification of important dates, including:
- proposed start-up
- proposed commencement of discharge

Evaluation

An evaluation should be provided of the:

- anticipated contaminants, loadings and concentrations in the effluent and the proposed discharge period
- receiving water quality data and flow data
- Applicable PWQOs
- any modifying parameters/conditions that might be applicable (e.g. hardness, pH, temperature)
- downstream waterbodies and water uses that could be affected and the anticipated effects
- any other information relevant to the deviation request

The parameter(s) for which a deviation from Policy 2 is being sought must be clearly stated.

Documentation

List any documentation (e.g. consultant's reports, MOEE correspondence, etc.) which was reviewed to support the request for a deviation. Copies of pertinent information must accompany the deviation request.

Liaison with Other Agencies

Communication with other agencies with a direct interest, especially the Ministry of Natural Resources and/or the Federal Department of Fisheries and Oceans, is encouraged, wherever appropriate, and the results of those discussions are to be summarized and included with the deviation request.

Other Issues of Potential Concern

Any other issues which may be of concern (e.g. other potential problem contaminants, proposed delisting of a waterbody, groundwater impacts, etc.) should be identified under this heading.

Reasons for Deviation Request

A statement of the basis for the deviation request must be provided, citing which of the four reasons identified in *Water Management* (Section 3.2.2) is being used. Any documentation supporting this basis is to be included.

Part 2

(To be completed by the Approvals Branch in consultation with the Region)

Abatement to be Applied

A brief evaluation of the type of treatment (e.g. reference to consultant's report or to pertinent discussions between Approvals Branch and the discharge proponent/consultant) should be supplied. An evaluation of the suitability of the proposed type and degree of treatment should be provided.

Approvals Branch should comment on the follow-up work subsequent to abatement controls that has been identified in, for example, the consultant's report or by Regional and Approvals Branch staff.

Other Issues of Potential Concern

Any other issues which may be of concern should be identified under this heading (e.g. other potential problem contaminants).

Part 3

(To be completed by the Program Development Branch)

Water Management Requirements

The Program Development Branch evaluates the information provided to determine the following:

1. Does the Program Development Branch agree that the quality of the waterbody, at the point of discharge for the parameter(s) of concern, does not meet the relevant PWQO (i.e. a Policy 2 situation)? Evaluation includes an assessment of the data base, comparison to PWQO, etc.)

2. Does the Program Development Branch agree that all reasonable and practical measures are to be taken and that exceptional circumstances prevail which preclude compliance with Surface Water Quality Management Policy 2?

3. Do the reasons for requesting a deviation fulfil the requirements specified in *Water Management*, Section 3.2.2?

4. Have concerns of other interested agencies been adequately addressed?

5. Have satisfactory arrangements been made for follow-up work subsequent to abatement controls?

After reviewing the recommendation of staff, the Director of the Program Development Branch will either:

1. Agree to a Deviation from Policy 2.

2. Agree, with qualifications, to a Deviation from Policy 2. (Qualifications specified)

3. Disagree, with reasons, with a Deviation from Policy 2.

4. Request further information upon which to base a decision on the Deviation Request.

The documentation will be forwarded to the Regional Director for review and signature or appropriate action related to qualifications or further information needs . A Deviation Request is considered to be granted once the Director of the Program Development Branch and the Regional Director have given their written consent.

Copies of the Deviation Request Form

Copies of the completed Deviation Request form and the decision regarding the request should be distributed as follows:

- Regional Director
- Director of the Program Development Branch
- Director of the Approvals Branch

The original, signed version of the Deviation Request and decision should be filed with the original copy of the Certificate of Approval, usually kept on file by the Approvals Branch.

GUIDELINE B-3
(formerly 15-04)

Resolution of Well Water Quality Problems Resulting from Winter Road Maintenance

Legislative Authority:

Environmental Protection Act, RSO 1990, Section 17

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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1.0 OBJECTIVE

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2.2 Payment

3.0 PROCEDURE FOR FIVE HOUSEHOLDS OR LESS

3.1 Handling of Complaints

4.0 PROCEDURE FOR MORE THAN FIVE HOUSEHOLDS

4.1 Priority Replacement
4.2 Use Consultants

SYNOPSIS

This guideline summarizes cost-sharing arrangements for situations in which restoration of groundwater supplies is required as a result of winter road maintenance by a road authority. It provides guidance to Ministry field staff, road maintenance authorities and the public in the interpretation, implementation and application of these arrangements.

1.0 Objective

To facilitate the reimbursement of homeowners when the restoration of ground water supplies is warranted as a result of winter road maintenance by a road authority.

2.0 Funding Arrangements

2.1 Eligibility

Any homeowner whose well supply requires restoration as a result of winter road maintenance by a road authority will be eligible for reimbursement by the Ministry of 75% of allowable costs. If the road authority agrees to participate, the homeowner will be eligible for the remaining 25% of allowable costs as well.

2.2 Payment

The Ministry shall provide reimbursement to the homeowner, either directly, or through the participating road authority.

3.0 Procedure for Five Households or Less

3.1 Handling of Complaints

The appropriate Ministry Regional Office will investigate the homeowner's complaint and prepare a report containing the conclusions, alternative courses of action and recommendations. Once a complaint is accepted by the Ministry, the cooperating road authority or the Ministry Regional Office will take action in cooperation with the affected homeowner to restore the water supply according to the report recommendations, and to compile invoices for review and subsequent reimbursement of the homeowner.

4.0 Procedure for More than Five Households

4.1 Priority Replacement

Where more than five households are involved, the present system under the Ontario Clean Water Agency (OCWA) Private Services Funding Program will apply. However, 25% of the cost, normally paid by the homeowner, may be paid by the road authority. All claims resulting from winter road maintenance will be regarded as a priority under the Program.

4.2 Use of Consultants

Where more than five households are involved, the use of consultants to identify problems and recommend solutions is advised.

GUIDELINE B-4
(formerly 15-05)

Snow Disposal and De-icing Operations in Ontario

Legislative Authority:

Ontario Water Resources Act, RSO 1990, Section 30
Environmental Protection Act, RSO 1990, Section 6
Environmental Assessment Act, RSO 1990, Section 5

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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1.0 SNOW DISPOSAL GUIDELINES

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1.3 Ministry Approval for Direct Disposal
1.4 Evaluation of Snow Disposal Sites

2.0 DE-ICING OPERATIONAL GUIDELINES

3.0 DE-ICING CHEMICAL STORAGE

4.0 THE *ENVIRONMENTAL ASSESSMENT ACT*

SYNOPSIS

The purpose of this guideline is to minimize the environmental impact of snow collection and disposal practices and de-icing operations. Guidance is provided to staff of the Ministry and road maintenance agencies.

Detailed information on the guidelines is contained in Procedure B-4-1: "Procedures for Snow Disposal and De-icing Operations in Ontario (1975)".

1.0 Snow Disposal Guidelines

1.1 Snow Removal

Snow removal operations shall be carried out as follows:

(a) snow from heavily travelled roadways shall be removed as quickly as possible following a storm; and

(b) efforts shall be made to minimize the chances of picking up refuse as part of the snow removal operations.

1.2 Snow Disposal

Direct disposal of snow to watercourses or ice-covered lakes and rivers shall be eliminated wherever possible. Disposal on properly selected land sites, based on the criteria outlined in 1.4, is considered, in most cases, the best solution.

1.3 Ministry Approval for Direct Disposal

If special circumstances preclude the disposal of snow on land sites or by other satisfactory means, Ministry approval from the Region is required prior to dumping directly to a watercourse.

1.4 Evaluation of Snow Disposal Sites

A number of criteria are used to evaluate the relative suitability of disposal sites. They are:

(a) accessibility;
(b) noise;
(c) alternative and future uses of the site;
(d) visual considerations;
(e) surface and sub-surface drainage;
(f) previous uses of the site;
(g) stability of the soils; and
(h) public safety;
(i) impact on neighbouring drinking water wells.

2.0 De-icing Operational Guidelines

The Ministry encourages the sensible and conservative use of sodium chloride and other de-icing compounds and recommends the following operational guidelines to be used by road maintenance agencies:

(a) reduce de-icing chemical application rates to the minimum amount necessary to successfully perform the job;

(b) employ rate-controlled distribution equipment which applies the de-icing chemical at the proper rate, regardless of the vehicle's speed;

(c) apply de-icing chemicals on main thoroughfares and critical sections of roadways only;

(d) where salt/sand mixtures are applied, incorporate into the admixture only enough salt to achieve the desired results; and

(e) consider special protective measures when de-icing chemicals are applied to places in proximity to very salt-sensitive areas (e.g., orchards, parks).

3.0 De-icing Chemical Storage

De-icing chemicals or sand/salt stockpiles shall always be protected from precipitation or surface runoff. The Ministry recommends that permanent storage structures be installed wherever possible.

4.0 The *Environmental Assessment Act*

Where an activity covered by this guideline is an undertaking under the *Environmental Assessment Act*, it shall not proceed except in compliance with that *Act.*

GUIDELINE B-5
(formerly 15-06)

Drinking Water Quality

Legislative Authority:

Ontario Water Resources Act

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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2.3 Non-Compliance
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SYNOPSIS

This guideline and the associated Procedure B-5-1: "Ontario Drinking Water Objectives (ODWO)" deal with the protection and enhancement of drinking water quality, and are intended to protect public health and encourage the provision of aesthetically pleasing water.

Detailed information on the objectives is contained in the Ministry's Procedure B-1-1 entitled "Water Management -- Guidelines and Procedures of the Ministry of Environment and Energy ("The Blue Book") and B-1-2: "Revised Tables of Objectives for Ministry of Environment and Energy's Publication "Water Management"".

The quality of drinking water shall conform to the limits described in Procedure B-5-1: "Ontario Drinking Water Objectives" except where indicated otherwise. Where the quality of drinking water is within provincial limits, every effort shall be made to maintain or improve that quality.

1.0 Definitions

Maximum Acceptable Concentration (MAC):

Limits applied to substances above which there are known or suspected adverse health effects.

Interim Maximum Acceptable Concentration (IMAC):

A health-related objective established for parameters for which there is insufficient toxicological data to establish a MAC with reasonable certainty. When it is not feasible for practical reasons to establish a MAC at a desired level, an IMAC may be established at an achievable level.

Maximum Desirable Concentration (MDC):

Limits on substances which, when present at concentrations above the limits, are either aesthetically objectionable to an appreciable number of consumers or may interfere with good water quality control practices.

2.0 Guideline Statements

2.1 Source Protection and Treatment

All drinking water systems shall have acceptable source protection and treatment processes to ensure that the appropriate limits for drinking water are met.

2.2 Sampling and Monitoring

Adequate sampling and monitoring programs are to be undertaken for chemical, physical, radiological and microbiological parameters, to ensure compliance with required water quality criteria (see Procedure B-5-1).

2.3 Non-Compliance

Whenever adverse sampling or monitoring results are encountered, appropriate response procedures are to be followed.

2.4 Notices

Drinking Water Notices will be issued, as required, to clarify or otherwise give notice of revisions to the Ontario Drinking Water Objectives document and its related guidelines and procedures.

3.0 Additional Guidance

Details on the above guideline statements may be found in Procedure B-1-2: "Revised Tables of Objectives for Ministry of Environment and Energy's Publication "Water Management"".

GUIDELINE B-6
(formerly 15-07)

Evaluating Construction Activities:

Gas/Oil Transmission Pipelines Crossing Watercourses

Legislative Authority:

The Ontario Water Resources Act, RSO 1990, Section 29
The Environmental Protection Act, RSO 1990, Section 3 & 6

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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5.0 METHODS OF SEDIMENT CONTROL

6.0 WATERCOURSE SENSITIVITY

6.1 Environmental Study Report (ESR)
6.2 Sensitive Watercourses
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7.0 MONITORING REQUIREMENT

8.0 IMPLEMENTATION

SYNOPSIS

This guideline deals with the evaluation of potential adverse impacts of pipelines during watercourse crossings, and the planning of adequate mitigative measures. It is intended to aid proponents, consultants and the public in preparing plans and assessments for proposed gas/oil transmission and distribution pipelines, as well as to direct and guide staff of the Ministry in reviewing environmental assessments and proposals for pipeline projects.

Detailed information on this guideline and its implementation can be obtained from Procedure B-6-1: "Evaluating Construction Activities Impacting on Water Resources (1994)".

1.0 Objective

This guideline is intended to ensure the use of good construction practices for transmission pipelines crossing watercourses, and the protection of the physical and biological integrity of Ontario's waterbodies.

Information on other environmental concerns of the Ministry for new or expanded gas/oil pipeline facilities proposed in Ontario is contained in Guideline D-3: "Environmental Considerations for Gas or Oil Pipelines and Facilities".

2.0 Application

This guideline applies to all energy-related transmission pipeline projects in Ontario. It concentrates on the watercourse crossing aspects of pipeline construction with respect to the production of sediment.

The Ministry is one of several provincial agencies responsible for reviewing proposals and applications for gas/oil transmission and distribution pipeline projects in the Province on behalf of the Ontario Energy Board and/or the National Energy Board. This guideline shall be used by Ministry staff in their review and by proponents in the evaluation of impacts and the planning of mitigative measures.

3.0 Effects of Sediments on the Aquatic Environment

Short and long-term effects of sedimentation may involve the alteration of the light, temperature and water chemistry regimes of the watercourse. As contaminated sediment may be released into the water column during trench excavation, bed disturbances shall be restricted to as small an area as possible.

4.0 Impacts of Sedimentation

Input from construction-related sediment loads may result in adverse impacts on the ecosystem and watercourse uses. Every effort shall be made to reduce the extent and duration of turbid conditions and the quantity of sediment loads.

5.0 Methods of Sediment Control

Nineteen recommendations for minimizing adverse environmental impacts of watercourse crossings are detailed in Procedure B-6-1: "Evaluating Construction Activities Impacting on Water Resources (1994)". The reduction of in-stream work time is a fundamental principle of the recommendations.

The method of stream-crossing selected shall be based on a site-specific evaluation. Adverse or undesirable water quality and water use impacts associated with watercourse crossings by transmission pipelines shall be minimized by applying the following criteria:

(a) the shortest possible construction time;
(b) construction during the season of least disturbance to aquatic biota and watercourse uses;
(c) limited in-stream disturbance; and
(d) immediate implementation of post-construction stabilization measures.

6.0 Watercourse Sensitivity

The sensitivity of a watercourse shall be determined through pre-submission of preliminary environmental assessment information by the proponent for review by local Ministry staff and other concerned agencies.

6.1 Environmental Study Report (ESR)

The Ontario Energy Board usually requires a proponent to prepare an ESR, which is circulated to concerned agencies for review. The sensitivity of the watercourse dictates the level of detail required in the report (see 6.2 and 6.3).

6.2 Sensitive Watercourses

A watercourse may be designated sensitive if there is any indication that water use will be adversely affected by short and/or long-term impacts. Detailed information on the proposed undertaking, existing environmental quality (pre-construction conditions), likely effects, and proposed mitigative measures shall be collected for sensitive watercourses. As well, the 19 recommendations referred to in Procedure B-6-1 shall be followed.

6.3 Non-Sensitive Watercourses

For a watercourse that has not been designated sensitive, the same approach outlined in Section 6.2 shall be used, but the level of detail contained in the ESR need not be as great.

7.0 Monitoring Requirement

Depending on watercourse sensitivity, the Regional Director may require the proponent to implement a monitoring program to provide the data necessary to make a quantitative assessment of the impacts of the pipeline crossing operation on the watercourse environment.

8.0 Implementation

The Regional Offices of the Ministry will be responsible for implementing this guideline. Additional detail on implementation requirements is contained in Section 5 of Guideline D-3: "Environmental Considerations for Gas or Oil Pipelines and Facilities."

GUIDELINE B-7
(formerly 15-08)

Incorporation of the Reasonable Use Concept into MOEE Groundwater Management Activities

Legislative Authority:

The Ontario Water Resources Act

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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6.0 DETERMINATION OF CONTAMINANT LIMITS AND ATTENUATION ZONES

SYNOPSIS

This guideline establishes the basis for determining the "reasonable use" of groundwater on property adjacent to sources of contaminants and for determining the levels of contaminant discharges considered acceptable by the Ministry.

The guideline is designed to facilitate implementation of the groundwater quality management directions contained in Procedure B-1-1: "Water Management -- Guidelines and Procedures of the Ministry of Environment and Energy," which are predicated on the protection of existing and potential reasonable uses of water. The reasonable use concept, in this context, applies only to groundwater quality management.

The technical details necessary for the application of the reasonable use approach shall be found in Procedure B-7-1: "Determination of Contaminant Limits and Attenuation Zones."

1.0 Introduction

The Ministry is charged with the conservation of the groundwater resources of the Province and the control of the use of these resources in an effective manner for the public good. To this end, the Ministry may wish to discourage the use of some environments for waste disposal and encourage the use of other environments. The Ministry position is that disposal sites should be placed in environments where their impact will be limited, that acceptable disposal methods should be used and that these methods should be compatible with those particular environments.

2.0 Objectives and Application of Reasonable Use Approach

This document explains the role of a "reasonable use" approach in the Ministry's activities related to the protection of groundwater quality. It establishes procedures for determining what constitutes the reasonable use of groundwater on property adjacent to sources of contaminants and establishes limits on the discharge of contaminants from facilities, approved by the Ministry, that are used for the disposal of waste into the shallow subsurface (referred to as "disposal sites" or "disposal facilities" in this document).

The impact a disposal facility may have on the reasonable use of neighbouring properties shall be limited to an amount that would not justify an award for damages in a civil law suit.

This guideline facilitates implementation of the Ministry procedures document B-1-1, "Water Management -- Goals, Policies, Objectives and Implementation Procedures of the Ministry of Environment and Energy," which are designed to protect existing and potential uses of water.

This guidelines applies to matters which fall under the authority of the *Environmental Protection Act* or the *Ontario Water Resources Act* (subject to appeal). In cases where the *Environmental Assessment Act* or the *Consolidated Hearings Act* is utilized, the decision-making power lies outside the Ministry, and the Ministry can only make recommendations.

The reasonable use concept applies only to groundwater quality management. Ministry surface water quality management guidelines are presented in procedures document B-1-1.

This guideline does not apply to the restoration of groundwater supplies that have been contaminated by "unregulated" sources, such as closed landfills or spills. These situations are addressed by Guideline B-9 (formerly 15-10): "The Resolution of Groundwater Quality Interference Problems."

2.1 Definitions

The terms "disposal site," "contaminant attenuation zone," and "adjacent property" are defined in Procedure B-7-1: "Determination of Contaminant Levels and Attenuation Zones."

3.0 The Administrative Basis for the Reasonable Use Approach

3.1 Guidelines

The Ministry position, as presented in the procedures document B-1-1, requires sufficient levels of environmental control to protect reasonable uses of the groundwater for present and future users in the Province.

This guideline is intended to assist in making decisions about current and future activities of the Ministry. It is not intended that all disposal facilities be investigated immediately to determine if they meet the levels for contaminant discharge described in this document.

3.2 Determination of Reasonable Use

The Ministry decision as to what constitutes reasonable uses of groundwater (either existing or potential) on land associated with, or adjacent to, disposal sites shall be made on a case-by-case basis. This is necessary because the wide variation in the quality, quantity and availability of groundwater makes a fixed approach impractical.

The responsibility for deciding what constitutes the reasonable use of the groundwater, as well as what uses should be protected, shall normally rest with the Regional Director. The Director's decision shall be made with input from a proponent and/or an assessment by staff. If this decision becomes a major issue, it may be made subject to a public hearing.

Reasonable current and potential uses shall be established, with respect to specific soil and water-bearing units in the subsurface, and would apply to all of the ground lying beneath a particular property.

The decision as to the reasonable use of the groundwater at a particular location shall be based on three major considerations:

3.2.1 The present use of groundwater in the vicinity

This is easily determined by a survey of the uses being made of the groundwater by nearby land owners and from data contained in Ministry files. In most instances, the current use shall be taken as the reasonable use.

3.2.2 The potential use of groundwater in the vicinity

Where there is no current use being made of the groundwater, criteria shall be established on the basis of the potential reasonable use(s) of that water, based on the existing quality and quantity of groundwater and the current use(s) of groundwater in the general area. In addition, planning agencies and others may provide input in determining potential land use (which might affect the use of the groundwaters).

3.2.3 The existing quality and quantity of the groundwater in the vicinity

The existing quality of the groundwater, and the amount that would be available to wells, shall be assessed by using data contained in Ministry files and a general knowledge of the hydrogeology in the area.

3.3 Potential for Domestic Consumption

The potential use of groundwater in Ontario will almost always be for domestic consumption. This is because:

(a) there are virtually no areas of Ontario where the quantity of groundwater that could be collected by a well would not meet the basic needs of a single family; and

(b) although there are parts of Ontario where the quality of the groundwater does not meet the Ontario Drinking Water Objectives, in most cases, individual owners have used such waters on a continuing basis over many years.

The presence of piped or surface water supplies does not, necessarily, mean that the groundwater is unsuitable for domestic consumption. However, such supplies may be a contributing factor in a determination where other considerations, such as groundwaters of poor quality and/or limited quantity, would detract from the usefulness of the groundwater.

The desirable qualities of drinking water are specified in the document "Ontario Drinking Water Objectives." Water quality objectives for the protection of fish and aquatic life and for agricultural use are stipulated in Tables 1 and 5 of the procedures document B-1-1. Each publication contains, in addition to the numerical objectives, directions as to their application.

It is also advisable to check with the Ministry for current Provincial Water Quality Objectives and Ontario Drinking Water Objectives.

In those instances where there is no Ministry objective for a given parameter, the Regional Director may specify what is considered to be an appropriate objective based on current scientific evidence.

3.4 Other Land Uses

Related land uses which could be affected by contaminants transported by groundwater, and which are compatible with a reasonable use approach, include:

(a) the use of the soil for agricultural activities;
(b) the use of the sub-surface for facilities such as sewers, electrical conduits or building foundations; or
(c) the use of the soil as fill.

4.0 The Technical Basis for the Reasonable Use Approach

A number of general technical considerations have been taken into account in the development of this document.

4.1 Good Groundwater Management Practices

The Ministry considers that the following positions shall represent good groundwater management practice:

(a) By selecting a suitable location and employing appropriate technology, no substantial groundwater resource in Ontario need be degraded by a waste disposal site or facility. However, there are subsurface units that contain groundwater that is unlikely to be used for water supplies. This may be because the groundwater in these units has naturally poor quality (e.g. brine), or the yield is too low for practical use, or the groundwater has been contaminated (by, for example, urban development) and this contamination is expected to continue. A beneficial and reasonable use of such a unit may be to receive and naturally attenuate or treat contaminants that have been generated as a result of the disposal of waste.

(b) Allocation of all of the attenuation capacity in a particular area to a single source of contaminants may not be prudent, because it may not be possible to prevent additional contaminant loadings in the future. Anticipated contaminant loadings shall be assessed, on a case-by-case basis.

(c) Provision shall be made for alleviating unacceptable environmental impacts, to the extent possible, should this prove to be necessary in the future. Unexpected events or failures shall be dealt with in a contingency plan. Those events that can reasonably be expected to occur shall be dealt with as part of the site design.

4.2 Safety Margins

Using current technology, it is not generally possible to estimate accurately the quantity or the quality of contamination which will be discharged by a disposal facility. Uncertainty factors, on the order of at least five-fold, are common in the measurement of parameters such as hydraulic conductivity. Therefore, safety margins shall be considered in all estimates of contaminant discharge.

The appropriate safety margin would have to be calculated on a case-by-case basis and depend on the complexity of the hydrogeological environment, the characteristics of the waste treated and the contaminants produced, the value of the resource, and the consequences of failure.

A higher level of certainty is possible when an existing contaminant plume is present and can be used in an assessment.

4.3 Hydrogeological Aspects

There are some practical differences in the hydrogeological aspects of facilities used for the disposal of solid waste and those used for liquid waste. These differences, which can be considered in applying this guideline, are:

(a) As a contaminant plume will generally develop more rapidly from liquid than solid wastes, the monitoring data needed to measure the performance of a liquid waste disposal facility may be collected relatively quickly. The technical, administrative and financial concerns associated with long-term monitoring of a solid waste disposal facility are greater.

(b) Contingency measures for a liquid waste disposal facility include shutting off the waste discharge and providing pre-treatment for the effluent. Such relatively simple contingency measures are probably impractical for a solid waste disposal facility.

4.4 Adjacent Land Use

The use of land adjacent to a disposal facility, in addition to those uses associated with water supplies, can be affected by liquid or gaseous contaminants transported by the groundwater or moving through the unsaturated zone in the subsurface. The protection of these uses is also the responsibility of the Ministry. This is addressed in Guideline D-4 (formerly 07-07) "Land Use On or Near Landfills and Dumps."

5.0 Environments Unsuitable for Waste Disposal

The Ministry may not support proposals for facilities for the disposal of waste in the following environments:

5.1 No appreciable attenuation can be provided

A disposal facility may not be supported in a location where no appreciable attenuation can be provided in the subsurface and an excessive amount of the attenuation required for acceptable discharge must be provided by dilution in surface waters. The impact on surface water by contaminants carried from a disposal site by the groundwater will almost always be undetectable. However, unacceptable circumstances might exist where the subsurface travel time for contaminants is very short and the time for the degradation of the easily biodegradable organic contaminants is inadequate to substantially reduce their concentrations.

5.2 Natural attenuation capacity is weak

A disposal facility may not be supported in a location where the ability of the natural environment to attenuate contaminants is weak, as in fractured rocks, and as compensation, a very large area is required for the attenuation of contaminants. For technical reasons, environments where this is necessary are generally quite expensive to evaluate and contingency plans in such environments are seldom practical.

5.3 The subsurface is suited for better use

A disposal facility may not be supported in a location where the subsurface beneath the facility is particularly suited for a better use. For example, waste disposal may not be supported in an esker of sand and gravel where the esker might be needed at some future date for the development of a water supply.

5.4 The consequences of failure are unacceptable

A disposal facility may not be supported in a location where the consequences of failure are unacceptable. For example, waste disposal may not be supported where failure and a resulting contaminant discharge might affect the sole source of a community water supply to an unacceptable degree.

6.0 Determination of Contaminant Limits and Attenuation Zones

The technical details necessary for the application of the reasonable use approach to proposed disposal sites, operating disposal sites, and disposal sites requesting approval for expansion shall be found in Procedure B-7-1 "Determination of Contaminant Limits and Attenuation Zones." In this document, guidance is provided for:

(a) determining quantitatively the acceptable levels of various contaminants originating in disposal sites and impinging on adjacent properties; and
(b) assessing the suitability of a contaminant attenuation zone, and the limits of a disposal site.

PROCEDURE B-7-1
(formerly referenced by 15-08)

Determination of Contaminant Limits and Attenuation Zones

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7.0 THE DETERMINATION OF LIMITS FOR DISPOSAL SITES REQUESTING APPROVAL FOR EXPANSION

1.0 Introduction

In this document, the reasonable use concept is applied to: (a) determining quantitatively the acceptable levels of various contaminants originating in disposal sites and impinging on adjacent properties; and (b) assessing the suitability of a contaminant attenuation zone, and a disposal site. Terms are specifically defined in Section 3.0.

2.0 Ministry Responsibility and Authority

The Ministry is charged with the conservation of the groundwater resources of the Province and the control of the use of these resources in an effective manner for the public good. To this end, the Ministry may wish to discourage the use of some environments for waste disposal and encourage the use of other environments. The Ministry position is that disposal sites should be placed in environments where their impact will be limited, that acceptable disposal methods should be used and that these methods should be compatible with those particular environments.

For waste disposal activities the Ministry has the management authority to:

(a) Issue a Certificate of Approval which would permit the use of property for contaminant attenuation or treatment. Discharge to neighbouring property must have no more than a negligible or trivial effect on the existing and potential reasonable use of this property. This is accomplished by limiting any increases in contaminant levels caused by this discharge to those specified in Section 5.1. The question of whether the effect is negligible, if challenged, could be established by the courts, which would decide if there is damage and how it can be measured in terms of dollars. This is inherent in the approach used by the Ministry in other situations, such as the issuance of air approvals.

(b) Prevent the owner of a disposal site, or a proposed disposal site, from using the sub-surface beneath the site for waste disposal purposes if this use is not felt to be in the public interest.

This management authority is subject to the limitations and qualifications in in Guideline B-7, "Incorporation of the Reasonable Use Concept into MOEE Groundwater Management Activities."

3.0 Definition of Terms

For the purpose of this document, the Ministry will consider three areas in assessing waste disposal proposals: the disposal site, the contaminant attenuation zone, and the adjacent property. These are defined in the following Sections.

3.1 The Disposal Site:

For the purposes of this document the term "disposal site" includes, but is not limited to the following:

(a) a "waste disposal site" under Part VI of the Environmental Protection Act (EP Act) and a "landfilling site" as defined in O. Regulation 309;
(b) an "exfiltration lagoon" defined as a "sewage works" under the Ontario Water Resources Act (OWRA); and,
(c) a "large subsurface sewage disposal system" under Part VIII of the EP Act and as defined in Notice 3/87, July 15 1987.

The intention is to identify the areas that receive waste and the adjoining land that is necessary for proper site operation. For example, in the case of a landfill, the disposal site or waste disposal site comprises the area on or in which wastes are deposited, (the "fill area"), and any bordering land, (the "peripheral area"), as shown on the accompanying diagram. In the case of an "exfiltration lagoon" or a "large subsurface sewage disposal system," terminology is defined in the appropriate guidelines.

The following comments apply to a disposal site:

(a) Future use of the land should be strictly controlled. Based on technical considerations, such control should be permanent or continued until it can be shown that such control is no longer necessary (see Section 46, EP Act).

(b) As there are environments which the Ministry does not believe are appropriate for waste disposal, the Ministry will either oppose the use of such environments or will insist that stringent safeguards be incorporated in any design for the disposal site and that there be appropriate monitoring and contingency plans. These safeguards may include provision for the collection and treatment of any contaminants which will be produced. Guidelines for identifying environments unsuitable for waste disposal are presented in Section 5.0 of Guideline B-7.

3.2 The Contaminant Attenuation Zone

The purpose of a "contaminant attenuation zone" is to allow the limited impairment of use of off-site property by means of easements or other methods without imposing the severe restrictions on land use which apply to the disposal site.

Where appropriate, a contaminant attenuation zone may be supported. It is outside of the disposal site and it is defined both with respect to the area of land which it underlies and also with respect to the depth at which it lies.

In the contaminant attenuation zone, it is intended that contaminants will be naturally attenuated to levels compatible with the reasonable use of the adjacent property as discussed in Guideline B-7, Section 3.2 and in order to meet the criteria specified in Section 5.1, below, contaminant levels in the contaminant attenuation zone may impair some uses of that zone. The operator of the disposal site must obtain the right to the use of this zone by reaching agreement with the property owner. The agreement should be registered on the title to this land.

Circumstances and environments favouring the designation of a contaminant attenuation zone are discussed in Section 4.0.

3.3 The Adjacent Property

The "adjacent property" is the land bordering the disposal site or the contaminant attenuation zone. Discharge of contaminants to adjacent property will have no more than a negligible effect on the present or potential reasonable use of that property. This will ensure that:

(a) the presence of the contaminant will not interfere with the construction, installation or good operation of any usual facility in the subsurface, such as utility conduits;

(b) the soil will not be contaminated to a degree which would interfere with its use;

(c) the groundwater will not be contaminated to a degree which would impair its reasonable use, as addressed in Guideline B-7 (Section 3.2).

4.0 Circumstances and Environments Suitable for a Contaminant Attenuation Zone

The Ministry may support an application for a disposal site involving the acquisition of land or an easement for a contaminant attenuation zone only under the following circumstances:

4.1 Alternate Sources of Water Available

An application may be supported where an alternate source of water is far superior to any associated with a contaminant attenuation zone. Here the Ministry may support the use of the groundwater for dilution and attenuation in a contaminant attenuation zone and take the position that the effect on reasonable uses on adjacent property would be negligible or insignificant, because that groundwater would not need to be used in any case.

This circumstance could arise as follows:

(a) where two water-bearing units are present, one being far superior to the other with respect to the quality, quantity and the accessibility of the water contained in it, the Ministry may accept the inferior unit as a contaminant attenuation zone, provided that this will not interfere with the use of the superior unit; or

(b) where good supplies of water are available, either from surface water sources or from municipal systems, and the groundwater supplies in a particular unit are marginal with respect to their quality and/or their quantity, the Ministry may support the use of that groundwater as a contaminant attenuation zone.

4.2 Contaminant Zone Limited

An application may be supported where only an acceptably small, clearly defined and hydrogeologically restricted portion of a subsurface unit will be degraded and this subsurface unit is not likely to be required for a higher use.

This procedure would allow the Ministry to support the use of certain Crown Lands in Northern Ontario or well defined zones of groundwater flow such as may be present in flood plains, as contaminant attenuation zones despite their physical ability to yield groundwater in "useful" quantities.

4.3 High Levels of Dissolved Solids Present

An application may be supported, under special circumstances and on a case-by-case basis, where naturally high levels of iron, manganese and/or total dissolved solids (where these are associated with hardness) are present in the groundwater and as a result, the limits imposed in Section 5.1 can not be met (see situations described in Section 5.2, examples 2 and 3). It is necessary to assess on a case-by-case basis because:

(a) unlike the case in surface waters, concentrations of iron, manganese and total dissolved solids commonly in excess of the Ontario Drinking Water Objectives are naturally present in Ontario groundwaters, and these groundwaters are routinely used for domestic supplies;

(b) these parameters are not related to health, at the levels stated in the Ontario Drinking Water Objectives, and in addition can be removed from a water supply with commonly available techniques; and

(c) it is not practical to eliminate waste disposal in a large percentage of the Province where the presence of iron, manganese and total dissolved solids naturally occurs in excess of the Ontario Drinking Water Objectives.

4.4 Areas Suitable in the Judgment of the Regional Director

An application may be supported where, in the judgment of the Regional Director, the most appropriate use of that environment would be as a contaminant attenuation zone, although it is suitable for other purposes as well.

5.0 The Determination of Limits for Proposed Disposal Sites

5.1 Basic Approach

In accordance with the appropriate criteria for particular reasonable uses, such as those specified in the Guideline B-1: "Water Management -- Guidelines and Procedures of the Ministry of Environment and Energy", a change in quality of the groundwaters on the adjacent property will be acceptable only as follows:

"Quality cannot be degraded by an amount in excess of 50% of the difference between background and the quality criteria for any designated reasonable use except in the case of drinking water. In the case of drinking water, the quality must not be degraded by an amount in excess of 50% of the difference between background and the Ontario Drinking Water Objectives for non-health related parameters and in excess of 25% of the difference between background and the Ontario Drinking Water Objectives for health-related parameters. Background is considered to be the quality of the groundwater prior to any man-made contamination."

This approach imposes a permanent upper limit to the amount of contamination that the owner of the adjacent property should have to tolerate. In accordance with Section 2.0, it is the Ministry's judgment that such increases in contaminant levels will have no more than a negligible or trivial effect on the existing or potential reasonable use of the adjacent property.

In assessing the amount of degradation that is acceptable, consideration is given to the natural, uncontaminated quality of the groundwater, the present quality of the groundwater and potential contamination of the groundwater from all sources.

5.2 Examples of the Application of the Concept

Examples of the application of this concept to three different situations are provided below:

Example 1 -- Where the designated reasonable use of groundwater allows no change in quality, no change is acceptable.

Example 2 -- Where the designated reasonable use of the groundwater is drinking water and the groundwater quality is presently better than the Ontario Drinking Water Objectives, a lowering of water quality on the adjacent property will be acceptable in accordance with the formula stated above.

Example 3 -- Where one or more groundwater quality parameters are currently at concentrations greater than the limits specified in the Ontario Drinking Water Objectives, but the groundwater is nonetheless in use as a drinking water source, then no further increase in the levels of these water quality parameters will be acceptable (see Section 4.3 for possible exception). Under these circumstances, increases in other parameters may be allowed in accordance with Section 5.1.

5.3 Examples of the Calculations

Two calculations are required to determine the amount of contamination that can discharge from a disposal site onto the adjacent property. The first calculation addresses the total contaminant impact at that location from all sources of contamination. The second addresses the permissible impact from the particular disposal site.

The maximum concentration (Cm) of a particular contaminant that would be acceptable in the groundwater beneath the adjacent property is calculated in accordance with the following relationship:

$$Cm = Cb + x(Cr-Cb)$$

The terms are defined as follows:

Cb — This is the background concentration of the particular contaminant in the groundwater before it has been affected by human activity (Section 5.1). This allows consideration to be given to the amount of increase in contaminant level.

Cr — This is the maximum concentration of the particular contaminant that should, in accordance with the Province's water management guideline be present in the groundwater. This value is dependent on the use (reasonable use) to be made of that groundwater (see Guideline B-7). It allows consideration of the total amount of contamination.

x This is a constant that reduces the contamination to a level that is considered by the Ministry to have only a negligible effect on the use of the water. For drinking water x is 0.5 for non-health related parameters or 0.25 for health related parameters. For other reasonable uses it is 0.5 (Section 5.1).

Levels of contamination greater than Cm may have an appreciable effect on the use of the adjacent property and the Ministry will not support an application for a disposal site with contaminant discharges which would cause this level to be exceeded.

The maximum concentration of a particular contaminant (Cw) originating in the disposal site that can be permitted to reach the adjacent property and still not cause Cm to be exceeded can be calculated in accordance with the following relationship:

$$Cw = Cm - Cp - Co$$

The terms are defined as follows:

Cp This is the concentration of the particular contaminant in the groundwater at the time of assessment, (i.e. the present background). This water may already contain some contaminants (Section 5.1). These contaminant levels must be subtracted to determine the contaminant increment that can be permitted from the disposal site.

Co This is the potential contaminant increase from other sources with a high degree of probability (see Guideline B-7, Section 4.1(b)). For example, potential chloride contamination from a highway under construction next to the site must be subtracted to determine Cw.

Using chloride from a landfill as an example, the maximum allowed chloride level (Cm) in the groundwater beneath the adjacent property and the maximum chloride discharge (Cw) to the adjacent property from a hypothetical landfill are calculated as follows:

(a) The reasonable use of the groundwater beneath the adjacent property has been determined to be for domestic supplies.

(b) The Ontario Drinking Water Objective for chloride is 250 mg/L. This represents Cr.

(c) The natural uncontaminated background concentration of chloride is estimated to have been 10 mg/L. This represents Cb.

(d) The measured concentration of chloride at the time of the assessment is 40 mg/L. This represents Cp.

(e) The expected additional chloride increase from a nearby highway that is presently under construction is estimated to be 20 mg/L. This represents Co.

(f) Chloride is considered to be a non-health-related parameter and therefore the constant (x) is 0.5.

The maximum allowed concentration (Cm) of chloride beneath the adjacent property, in accordance with the relationship:

Cm = Cb + x (Cr-Cb) is therefore:

$$10 + 0.5\ (250\text{-}10) = 130\ \text{mg/L}$$

The maximum concentration of chloride (Cw) from the disposal site that can be permitted to reach the adjacent property, in accordance with the relationship Cw = Cm - Cp - Co is therefore:

$$130 - 40 - 20 = 70\ \text{mg/L}$$

It should be noted that the chloride ion may not be the critical contaminant (i.e. the contaminant parameter which will most closely approach its maximum allowed value, Cm, and thus represent the limit to which the site is designed). However, it is commonly used in contaminant investigations because of its usefulness as a "tracer". The critical contaminant is dependent on several factors including the characteristics of the wastes and the hydrogeologic environment and is determined on a case-by-case basis.

5.4 Site Assessment

The assessment of the proposed disposal site should be carried out in accordance with any pertinent Ministry guidelines. In addition, Section 4.0, "The Technical Basis for the Reasonable Use Approach," of Guideline B-7 should be considered with particular reference to those parts relating to the provision of a safety margin in making estimates of contaminant discharges (Section 4.2).

6.0 Limits for Operating Disposal Sites

An operating disposal site is handled as follows:

(a) An operating site should meet the same limits for contaminant discharge (Section 5.1) as a proposed site.

(b) The judgement as to the amount of off-site impact that the site will produce may be based on actual off-site measurements of contaminant levels or on predictions of off-site contaminant levels which are based on on-site measurements. This reduces the requirements for a safety margin in calculations (Guideline B-7, Section 4.2).

(c) If contaminant concentrations exceed the limits specified in Section 5.1, the site should be closed in a manner to minimize environmental damage, or the

operation should be modified. It is acceptable to modify the operation of the disposal site, for example in the case of a landfill by collecting a part of the leachate, in order to meet the specified limits. However, if these levels are exceeded, all waste disposal, except that done in conjunction with a reasonable plan for closure or with remedial activities, should be terminated until the specified limits have been met, or until monitoring data indicate that these limits will be met. Determinations on the replacement of contaminated water supplies and the abatement of the contaminant plume must be made on a case-by-case basis in accordance with Guideline B-9 (formerly 15-10) entitled: "Resolution of Groundwater Quality Interference Problems."

7.0 Limits for Disposal Sites Requesting Approval for Expansion

An Approval for a disposal site requesting expansion will be handled in the same manner as an Approval for a new site or a proposed site (i.e. it must meet the limits specified for contaminant discharge in Section 5.1).

GUIDELINE B-8
(formerly 15-09)

Evaluating Construction Activities --

Highways and Bridges

Legislative Authority:

Ontario Water Resources Act, RSO 1990, Section 30
Environmental Protection Act, RSO 1990, Section 14
Environmental Assessment Act

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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SYNOPSIS

This guideline addresses water resource concerns related to the construction of highways and bridges and is for use in the environmental impact assessment process by proponents and Ministry staff. The intent is to provide assistance both in anticipating potential impacts and in planning adequate mitigative measures.

Detailed information on this guideline is contained in the Ministry Procedure B-6-1, "Evaluating Construction Activities Impacting on Water Resources (1994)".

1.0 Objective

The objective of this guideline is to ensure that good construction practices for highways and bridges are used in order to minimize sediment input into watercourses, and that the physical and biological integrity of Ontario's waterbodies are protected in accordance with Guideline B-1.

2.0 Application

This guideline applies to all highway and bridge projects in Ontario. Most of these projects are carried out by the public sector and are subject to the *Environmental Assessment Act.*

Under the Act, proponents are required to prepare an environmental assessment (EA) for review by concerned agencies prior to a decision by the Minister regarding approval. This guideline shall be used by Ministry staff in their review of EAs submitted as part of the EA procedure, and by proponents for evaluating water resources impacts and planning mitigative measures.

3.0 Effects of Highway and Bridge Construction

Short and long-term effects of highway and bridge construction on the aquatic environment may involve erosion and sedimentation, degradation of ground and surface water quality, disruption of ground and surface water quantity, damage to watercourse bed and banks, channel modification, and an increase in surface runoff. These effects may have negative impacts on the watercourse ecosystem and on other beneficial uses.

4.0 Mitigation of Construction-Related Impacts

Recommendations to mitigate and minimize potential short and long-term impacts are outlined in Procedure B-6-1. Short-term, construction-related impacts generally can be

minimized through sound construction practices and various site-specific control methods. Long-term impacts can be minimized through a combination of careful project design and site restoration measures.

5.0 Water Resource Requirements in Environmental Assessment Reports

The following water resource requirements shall be considered by proponents and reviewers during the preparation and review of EA reports:

(a) baseline data on the pre-construction conditions as they pertain to the quality and quantity of surface and groundwater;

(b) a description of the proposed undertaking and identification of potential impacts;

(c) an estimation of impact magnitude;

(d) a strategy for the implementation of mitigative measures;

(e) a rehabilitation plan for the site and/or route;

(f) a monitoring program for evaluating the effectiveness of construction-related mitigative measures and the rehabilitation plan; and

(g) summary statements on the above-mentioned water resource requirements which are substantiated by valid references and/or data, with verifiable results of all analyses.

6.0 Guideline Implementation

This guideline shall be implemented:

(a) during the review and preparation of EAs; and

(b) during field inspection and EA review.

GUIDELINE B-9
(formerly 15-10)

Resolution of Groundwater Interference Problems

Legislative Authority:

Ontario Water Resources Act
Environmental Protection Act

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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SYNOPSIS

This guideline is intended to facilitate implementation of the groundwater quality management guidelines spelled out in Procedure B-1-1: "Water Management - Guidelines and Procedures of the Ministry of the Environment (under revision)."

The guideline describes the Ministry position in dealing with the abatement of groundwater contamination caused by activities that are not being carried out under a Certificate of Approval issued by the Ministry. The intent is to provide guidance to Ministry staff in evaluating and resolving cases of groundwater quality interference caused by such activities.

Additional details are contained in Procedure B-9-1: "Resolution of Groundwater Quality Interference Problems".

1.0 Definitions

Environment:

For the purposes of this guideline, the environment includes: the subsurface; water within the subsurface; and the path traversed during the movement of contaminants:

- from the surface to the subsurface;
- from the subsurface to the surface; and
- within the subsurface.

Groundwater Quality Interference:

The deterioration of the quality of groundwater resulting from the release of contaminants.

2.0 Ministry Jurisdiction

The Ministry has jurisdiction over the investigation, clean-up and restoration of the environment and/or water supplies.

3.0 Who Can Take Action

The action necessary to resolve these cases can be taken by the polluter, the affected party, the Ministry, the municipality or others.

4.0 Mechanism for Action

There are a number of mechanisms available to ensure that the appropriate action is taken. These include the use of Ministerial Orders, outside consultants, or voluntary support from either the polluter or the affected party. The Ministry, the municipality or others may also perform the work required.

5.0 Responsibility of the Ministry

The Ministry shall, in all cases and at all times, ensure that action is taken to resolve groundwater quality interference and this responsibility will not be abdicated when delegated to or assumed by any other party. The Ministry may order, request or hire someone to carry out the required work to its satisfaction.

The required resolution of each case with respect to clean-up and restoration will be determined and specified by the Ministry and will depend upon site-specific conditions.

Implementation procedures and guidelines are presented in detail in Appendix A of Procedure B-9-1: "Resolution of Groundwater Quality Interference Problems".

6.0 Responsibility of the Owner

It is the responsibility of the owner of the contaminant or the person having control of the contaminant to pay for all costs associated with the contaminant discharge including the investigation, the clean-up of the environment, and the restoration of affected water supplies, and to do all that is practicable to minimize damage caused by the contaminant discharge, and to facilitate clean-up.

Where it will not substantially impede the resolution of a problem, the polluter shall be given the opportunity to act in any or all aspects of the clean-up, investigation or restoration. However, when the Ministry is not satisfied with the progress being made by the polluter, the Ministry shall proceed to resolve or alleviate the problem using whatever means are available and appropriate.

Where the pollution is a "spill" under Part X of the *Environmental Protection Act*, the polluter has a clear duty to clean up, and specific tools are available to the Ministry (see Sections 93, 94, 97 and 100).

7.0 Action Plan

In no case shall substantial Ministry funds be expended or costly corrective action ordered until an action plan has been prepared. The plan should take the following into consideration:

a) the anticipated scope, timing and methodology of the investigation, clean-up, and restoration;
b) the anticipated legal and administrative action for closing out the problem and collecting funds, should this be necessary.

8.0 Funding and Costs

Prior to any extensive investigations, the costs of the proposed resolution -- including investigation, clean-up and restoration -- shall be weighed against the benefits of doing the work. (See Appendix B of Procedure B-9-1.)

Where it is anticipated that costs to the Ministry for the investigation, clean-up and restoration will be significant, the Regional Director shall have to seek funds from the appropriate source.

9.0 Clean-up

The Ministry shall decide on a case-by-case basis what, if any, level of clean-up it will require or undertake. (See Appendix B of Procedure B-9-1.)

10.0 Restoration

The permanent restoration of water supplies which have been significantly affected and the provision of temporary supplies shall be required or undertaken in cases where the problem is caused by a third party (not the complainant), whether or not the specific origin of the contamination can be identified.

No restoration will be undertaken where the problem is: self-induced; of a natural cause; or insignificant.

PROCEDURE B-9-1
(formerly referenced by 15-10)

Resolution of Groundwater Quality Interference Problems, Revised 1993

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RESOLUTION OF GROUNDWATER QUALITY

INTERFERENCE PROBLEMS

1.0 Introduction

This document is intended to facilitate implementation of Guideline B-1: "Water Management -- Guidelines and Procedures of the Ministry of Environment and Energy" (under revision). It describes the Ministry position in dealing with the abatement of groundwater contamination caused by activities that are not being done under a Certificate of Approval from the Ministry. These activities include, but are not limited to:

a) spills or accidental discharges of contaminants
(EP Act Part X, Guideline G-1)

b) discharges of contaminants from facilities that have been used for the disposal of wastes but are now closed.
(EP Act Part V, Guideline D-4)

c) discharges of contaminants from ongoing or past activities not associated with the disposal of waste such as the decommissioning an industrial facility.
(EP Act Part II, Guidelines for Decommissioning and Clean-up of Sites).

Guidleine B-7: "Incorporation of the Reasonable Use Concept into MOEE Groundwater Management Activities" addresses Disposal Sites with Certificates of Approval.

2.0 Background Assumptions

As a result of a detailed review of many factors, including Part X of the Environmental Protection Act, RSO, 1980 (and the report of the Abatement Procedures Committee), the following assumptions have been made by Working Group V in Developing guidelines and procedures for resolving groundwater quality interference problems:

(1) It is the policy of the Ministry to ensure that action is taken to clean up and restore the environment in such a manner that inconvenience to the public and environmental damage are minimised. This includes action for restoring affected water supplies or providing alternate sources for these supplies affected by a third party.

This does not imply that the Ministry is responsible for the contaminant discharge with respect to its cause or for any costs which might be incurred for restoring the environment, for restoring affected water supplies, or for damages to individuals. Such costs are ultimately the responsibility of the person who caused the spill and/or the person owning or having control of the contaminant.

(2) Legislation and resources are, or will be, available which will allow the Ministry to require the clean-up and restoration of the affected supplies.

(3) The resolution of groundwater quality interference problems is not dependent upon the availability of funds from either the person who has caused, or is accused of causing, the contamination, or the person damaged by the interference. Funds for investigation, clean-up and/or restoration are, or will be, available to the Ministry.

The following is a conceptual outline of the proposed policy approach to the resolution of groundwater quality interference problems:

a) The Ministry has jurisdiction over the investigation, clean-up and restoration of the environment and/or water supplies;

b) the action necessary to resolve these cases can be taken by the polluter, the affected party, the Ministry, the municipality or others;

c) there are a number of mechanisms available to ensure that the appropriate action is taken. These include the use of Ministerial Orders, outside consultants, voluntary support from either the polluter or the affected party, or by the Ministry, the municipality or others doing the work required.

3.0 Decisions to Permit Implementation

A number of administrative decisions have been made to facilitate the implementation of the guideline.

3.1 Responsibility

It is the policy of the Ministry in all cases and at all times to ensure that action is taken to resolve groundwater quality interference and this responsibility will not be abdicated when delegated to, or assumed by, any other party. This guideline applies to the clean-up of contaminants in the environment and the restoration or replacement of groundwater supplies (e.g. water wells, springs). The Ministry may (when necessary) order, request or hire someone to carry out the required work to its satisfaction.

This does not detract from the responsibility of the owner of the contaminant or the person having control of the contaminant to pay for all costs associated with the contaminant discharge including the investigation, the clean up of the environment, and the restoration of affected water supplies and to do all that is practicable to minimize damage caused by the contaminant discharge and to facilitate clean-up.

Where it will not substantially impede the resolution of a problem the polluter will be given the opportunity to act in any or all aspects of the clean-up, investigation or restoration. However, when the Ministry is not satisfied with the progress being made by the polluter, the Ministry will proceed to resolve or alleviate the problem using whatever resources are available and appropriate. Where pollution is a "spill" under Part X of the Environmental Protection Act, the polluter has a clear duty to clean up, and specific tools are available to the Ministry (see Sections 93, 94, 97 and 100).

The required resolution of each case with respect to clean-up and restoration will be determined and specified by the Ministry and will depend upon site-specific conditions. Implementation procedures timing and operational considerations are presented in Appendix A and Appendix B.

3.2 Timing

The Ministry will ensure that appropriate action is taken as quickly as possible to minimize public inconvenience and environmental damage.

3.3 Action Plan

In all cases, an Action Plan (See Appendix A and B) for resolving the problem will be prepared early in the proceedings before substantial funds are expended or costly corrective action ordered. The Action Plan should take the following into consideration:

- the anticipated scope, timing and methodology of:

- investigation;
- clean-up;
- restoration;

- the anticipated legal and administrative action for closing out the problem and collecting funds, should this be necessary.

3.4 Funding and Costs

Prior to any extensive investigations, the costs of the proposed resolution - including investigation, clean-up and restoration - shall be weighed against the benefits of doing the work. This
cost/benefit assessment should be considered in the Action Plan (Section 3.3 and Appendix B)

Where it is anticipated that costs to the Ministry for the investigation, clean-up and restoration will be significant, the Regional Director will have to seek funds from an appropriate source, such as the Security Account.

3.5 Clean-Up

The Ministry will decide on a case-by-case basis what, if any, level of clean-up it will require or undertake. (see Appendix B)

3.6 Restoration

The permanent restoration of water supplies which have been significantly affected and the provision of temporary supplies will be required or undertaken in cases where the problem is caused by a third party (not the complainant), whether or not the specific origin of the contamination can be identified.

No restoration will be undertaken where the problem is:

- self-induced;
- of a natural cause, or
- insignificant. (see Appendix A, 4)

APPENDIX A

IMPLEMENTATION PROCEDURES AND TIMING OF MINISTRY RESPONSE TO COMPLAINTS ABOUT CONTAMINATED WATER SUPPLIES

1. Ministry personnel will acknowledge by telephone, mail or a site visit each complaint or notification of contamination within three working days. Where a public health or safety factor is identified, the Ministry must respond immediately and in accordance with Guidleine G-1.

2. As soon as practicable after the initial response, the Ministry will place the problem in one of the following categories:

   (a) the contamination is from a natural source;
   (b) the contamination is the fault of the owner;
   (c) the contamination is insignificant and thereby does not require Ministry involvement;
   (d) the contamination is significant and derived by "unnatural" processes from an outside source or a third party (the particular source does not have to be specifically identified at this stage);
   (e) the contamination cannot be attributed to any of the foregoing.

   Special circumstances which might require some delay at this stage are:

   (i) where poor well construction causes complications which make it impossible for the Ministry to categorize the problem. Under these conditions, the Ministry will require that the owner rectify this well construction problem before it proceeds with any further action or investigation;

   (ii) where the Ministry wishes the well owner to undertake some work, perhaps pump the well to waste or retain a contractor to clean out the well, before the Ministry is able to categorize the problem.

3. Category (a), (b), or (c)

   If it is determined that the contamination is (a) natural, (b) the fault of the owner, or (c) insignificant, the Ministry will withdraw from the problem.

   If the complainant is not satisfied with this decision, he/she may proceed independently to investigate the cause of the problem. The Ministry may be re-involved based on the results of this investigation.

4. Category (d)

   If the contamination is identified as (d) from an outside source, the Ministry will ensure that the complainant is provided with a temporary water supply until arrangements can be made for a permanent supply.

   Temporary and permanent supplies will be provided under the following conditions:

   (a) where the Ontario Drinking Water Objectives for health related parameters are exceeded. These objectives are listed in Ministry Guideline B-1 "Water Management -- Guidelines and Procedures of the Ministry of Environment", November 1978, Revised May 1984. The most recent water quality data are available from the Program Development Branch.

   (b) at the discretion of the Regional Director where the Ontario Drinking Water Objectives for non-health-related parameters are exceeded.

   (c) on the advice of the Medical Officer of Health.

   (d) on the advice of a veterinarian when the water is to be used for livestock.

   Temporary or permanent water supplies will only be provided where the increase in the concentration of a contaminant from an outside source, is considered by the Regional Director to be significant.

   Temporary or permanent water supplies may be provided by the complainant, by the person responsible for the contamination, by the municipality, or by the Ministry. These supplies must be acceptable to the Ministry.

5. Category (e)

If the cause of the complaint cannot be identified as (a), (b) or (c), or the contaminant cannot be identified as (d) from an outside source, the investigation will continue. The major objective of this continuing investigation will be to classify the complaint to either justify the provision of a temporary supply or to indicate whether or not the Ministry should withdraw from the problem.

A temporary and/or a permanent water supply will be provided only if the problem has been classified as (d) from an outside source, or if this is expressly directed by the Regional Director. The Director may allow provision of a temporary water supply when there is good reason to believe that the contamination is from an outside source (d) but evidence is not as yet conclusive.

6. Preparation of Action Plan

If after the contaminant has been determined to be from (d) an outside source, and a temporary supply has been provided, or if the cause of the complaint is (e) not identified, and the Ministry is still involved, the Ministry will prepare an Action Plan. This Action Plan will be prepared and communicated to all interested parties within a maximum of 25 working days following receipt of the complaint. It will outline a program (critical path method or some other approach that ensures consideration of all alternatives and the necessary decisions) for dealing with the problem.

The Action Plan prepared at this stage may be subject to modification as more data are collected but it should be completed at this early stage in the proceedings, at least in a tentative format. This is necessary for a number of reasons. For example, the extent of the hydrogeologic appraisal of the problem will be dependent on factors such as the acceptability of various procedures for supply restoration, the need for detailed data to support legal actions and the need for the identification of the source of the contaminant.

The Action Plan should specify the following:

(a) The critical stages in the investigation and resolution of the problem and potential legal action, as well as the chronology for these stages.

(b) The deadlines for the provision of a temporary water supply and the time in which the Ministry will make a commitment to the home owner to provide a permanent water supply if this is shown to be necessary.

The Action Plan should also identify potential sources of permanent water supplies. However, the time necessary to restore the supply on a permanent basis is difficult to specify as it depends on such factors as the availability of contractors and agreements with municipalities for connections to municipal systems. This time must be specified once a commitment is made for a permanent supply. However, delays of greater than two months to evaluate the rate in which the contaminants will be attenuated by natural processes after the cause of the contamination has been identified will not normally be acceptable.

APPENDIX B

OPERATIONAL CONSIDERATIONS

Action Plan and Cost/Benefit Assessment

As addressed in Appendix A, Part 6, an Action Plan is required in cases where there is interference with groundwater supplies. This Plan is either developed by the person responsible for the contamination and approved by the Ministry, or by the Ministry. The Action Plan is intended to speed up the Ministry internal decision-making process so as to eliminate unnecessary inconvenience to the public caused by delay in restoring water supplies. In cases where groundwater supplies are not involved, an Action Plan is not required; however it is strongly recommended as a means of developing an efficient contaminant abatement program.

A basic part of any Action Plan is an assessment of the potential costs and benefits of any abatement and water supply restoration. This assessment is necessary even where an Action Plan is not prepared. The Action Plan should also specify the level of clean-up that will be required. As noted below a complete clean-up may not be feasible.

The following general principles apply to the abatement of groundwater interference problems:

1. In any cost evaluation (the cost of clean-up, and/or the cost of restoration, versus the benefits of doing the work), clean-up will be required unless the costs for clean-up are far in excess of any benefits. In general, the availability of inexpensive alternative supplies and/or treatment methods will not be considered as a reason for not requiring environmental clean-up.

2. Some contaminants cannot be completely removed from the subsurface with the technology that is currently available. This applies in particular, to non-aqueous phase liquids. Although it may sometimes be possible to remove the contaminating liquids themselves, it may not be feasible to remove all of the contaminants dissolved in the soil water or sorbed on the soils. Under these circumstances, although an extensive "clean-up" may remove the bulk of the contamination, it may not return the associated groundwater to a condition where it would serve a drinking water supply.

Other circumstances where complete clean-up may not be feasible would be where the contamination is from a source that cannot be practically removed, such as large mine tailings areas or waste disposal sites.

Where such conditions exist the only practical abatement options may be to control the further spread of the contaminants and/or to restrict the use of the groundwater in the area that is already contaminated and/or to re-supply the affected users with potable water from another source. Such options would require that arrangements that are satisfactory to the Ministry be made with the owners of any affected lands. It may be necessary to attach such arrangements to the title to the land.

Considerations in Determining the Scope of the Investigation

The following factors should be taken into account in determining the extent of an investigation intended to isolate the source of contamination:

1. Some hydrogeologic environments are particularly difficult to evaluate and to investigate and some contamination cases, particularly where more than one possible source is present, may be extremely difficult to resolve. Where success seems unlikely, an inordinate amount of money should not be spent in seeking the source of the contamination.

2. There is little point in pursuing an exploration program, the only purpose of which is to positively identify the owner of a contaminant or the party responsible for the contamination, in cases where only an insignificant portion of the costs associated with the exploration program and the resolution of the problem (clean-up, restoration, and exploration costs) could be recovered from any of the parties who might be found responsible for these costs.

3. Where the cost of resolving a problem are significantly less than those than those involved in identifying the owner of the source of the contaminants and the legal costs, the Ministry should proceed with the environmental clean-up and the restoration of water supplies as necessary, without attempting to assign responsibility for the problem.

Considerations in Determining the Extent, Urgency and Method of Environmental Clean-Up

The following factors should be taken into consideration in establishing the extent and urgency of clean-up programs:

1. The availability and cost of alternate sources of water.
   (a) area serviced by a public water supply;
   (b) nearby surface water available;
   (c) alternate aquifers available;
   (d) alternate sources of water are not available except at exorbitant costs.

2. The practicability of treating the contaminated supplies to an acceptable level.

3. The number of wells which have been or are likely to be affected by the contamination and the number of people involved.

4. The potential for restricting the use of groundwater in the contaminant plume (for example, by buying the land).

5. The quality of the 'natural' groundwater in the area.

   (a) naturally poor
   (b) previously contaminated.

6. The potential for mineral extraction from the groundwater.

7. The impact (corrosiveness) of the contamination on buried utilities, building foundations etc.

8. The potential for impact on nearby surface water.

9. The time which could be required for the natural attenuation of the contaminants in the groundwater (days, years, indeterminate).

10. The toxicity of the contaminants.

    (a) toxic at levels below which the water supply would be rejected because of an unpleasant taste and/or odour;

    (b) toxic at levels exceeding those where the water supply would be rejected because of an unpleasant taste and/or odour.

11. The rate at which the contaminant plume is expanding. This would determine the urgency for action to reduce:

    (a) the cost of the clean-up;
    (b) the spread of the contaminants, etc.

Where dealing with an "old" contaminant plume which can be shown to be relatively stable, some delay may be acceptable.

12. Potential for interference with activities on the ground surface.

Considerations in Determining the Method of Temporary Water Supply Restoration

In most cases the establishment of the initial temporary water supply will be by a trucked supply to a temporary tank. There will, however, be some cases where alternate methods will be preferable either because of expense or convenience. For example, it may be acceptable to provide a hydrant in a public place and allow the affected parties to carry their drinking and cooking water home.

Considerations in Determining the Method of Permanent Water Supply Restoration

The method by which an affected water supply will be restored will be selected primarily on the basis of cost and convenience to the user. Cost estimates will consider the maintenance of the system, the time it will have to operate (e.g. considering natural attenuation of the contaminant), and the possibility that contamination will spread and affect additional water supplies and the system will have to be expanded.

Methods of permanent restoration include:

1. Connection to a municipal supply.
2. Drilling a new well, reconstruction or deepening of an existing well.
3. Treatment of the contaminated supply.
4. Use of a source of surface water.
5. Hauling of water by truck.

Where large costs are involved in the final restoration of water supplies, a decision on this final restoration may be delayed pending the results of an exploration program to designate the best source for the new permanent supply.

Use of Outside Experts, Consultants, Contractors and Municipalities

In most cases, Ministry personnel will carry each case up to the stage of documenting a strategy (i.e. preparation or approval of the Action Plan) for the resolution of the problem. At that point, consideration may be given to employing assistance from outside the Ministry. Variations from this approach may be taken at the discretion of the manager involved.

Notification of Parties Responsible for the Contamination

When the source of the contamination has been defined to a high level of certainty, notification will be sent to the parties believed to be responsible for the contaminant discharge and they will be given an opportunity to participate in the resolution of the problem. If no response is received within ten days, or if the response is negative, the Ministry will proceed independently or issue an order requiring action by the responsible parties.

In cases where there is a reason to proceed expeditiously, proceedings will not be delayed to accommodate participation by the parties responsible for the contaminant discharge.

A party affected by the contamination should not be inconvenienced by delays in restoring the water supply on a temporary or on a permanent basis caused by this notification.

Restoration of Supplies in Serviced Areas

From time to time, supplies in serviced areas may be affected by a municipality in its performance of its public service. Causes would include:

- contamination due to winter road maintenance (see also discussion of road maintenance activities in the following section);
- the storage of road salt or sand/salt mixtures;
- blasting for sewers etc.;
- leaking gasoline storage tanks;
- leaking sewers, etc.

Under these circumstances, the owner of a contaminated well may be asked to connect to the municipal supply. Under Section 100, EPA, a person is entitled to compensation for loss or damage incurred as a direct result of a spill. Where there may have been a spill, the Environmental Compensation Corporation may be contacted at 416-323-4826 (collect).

Contamination of Supplies by Road Maintenance Activities

Where a water supply or the environment has been contaminated by road deicing materials originating in a storage area, the problem will be the responsibility of the responsible road authority and will be handled in accordance with this policy and these guidelines. Where the contamination is from the application of deicing chemicals on a

road for the purposes of deicing, Ministry Guideline B-3 entitled: "Resolution of Well Water Quality Problems Resulting from Winter Road Maintenance" applies.

Bacterial and Nitrate Contamination - Septic Systems and Feedlots

Under this guideline, the Ministry will not be responsible for the resolution of bacterial or nitrate contamination problems caused by a number of septic systems interfering with wells in a sub-division. The Ministry Private Servicing Funding Program may have applicability in these situations. Normal procedures for the restoration of the environment and the water supply can be followed however, where one particular source of either nitrate or bacteria, outside the sub-division, such as a feedlot or another subdivision can be identified. Temporary supplies will be provided in such cases only after a particular outside source is designated.

This position was adopted as it was felt that the Ministry could not or would not wish to:

a) provide temporary supplies for entire sub-divisions under this guideline, without hope of recovering the costs;

b) designate specific cause and effect for individual well and septic tank systems (usually a Medical Officer of Health responsibility) or provide temporary supplies for such individual problems.

Federal Projects

Contamination originating on Federal projects is not the responsibility of the Ministry. The Ministry will act as necessary to liaise with Federal authorities.

Leaking Sewers

Normal procedures for supply restoration will be followed where contamination is attributed to a leaking sewer in an area where there is not a municipal water supply service.

GUIDELINE B-10
(formerly 15-11)

Evaluating Construction Activities -- Marine Construction Projects

Legislative Authority:

Ontario Water Resources Act
Environmental Protection Act
Environmental Assessment Act

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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3.0 EFFECTS OF MARINE CONSTRUCTION

4.0 MITIGATION OF CONSTRUCTION-RELATED IMPACTS

5.0 WATER RESOURCE REQUIREMENTS IN ENVIRONMENTAL ASSESSMENT REPORTS

6.0 GUIDELINE IMPLEMENTATION

SYNOPSIS

This guideline applies to construction projects in any surface waters. It was developed for use in the environmental impact assessment process by proponents and Ministry staff. The intent is to provide assistance both in anticipating potential impacts and in planning adequate mitigative measures.

Detailed information on this guideline is contained in Procedure B-6-1, "Evaluating Construction Activities Impacting on Water Resources (1994)".

1.0 Objective of Guideline

The objective of this guideline is to ensure that good construction practices are used to minimize sediment input into watercourses, and that the physical and biological integrity of Ontario's waterbodies are protected in accordance with Guideline B-1.

2.0 Application

This guideline applies to all marine construction projects in Ontario:

a) that are subject to the *Environmental Assessment Act*; or

b) that are in the private sector or not otherwise subject to the *EA Act*. In these cases the Ministry will recommend to the reviewing agency that the requirements of this guideline be applied.

Under the *EA Act*, proponents are required to prepare an environmental assessment (EA) for review by concerned agencies prior to a decision by the Minister regarding approval. This guideline shall be used by Ministry staff in their review of EAs submitted as part of the EA procedure, and by proponents in the evaluation of water resources impacts and in the planning of mitigative measures.

3.0 Effects of Marine Construction

Short and long-term effects of marine construction on the aquatic environment may involve erosion and sedimentation, degradation of ground and surface water quality,

disruption of ground and surface water quantity, damage to watercourse beds and banks, channel modification, and increase in surface runoff.

These effects may have negative impacts on the watercourse ecosystem and on other beneficial uses.

4.0 Mitigation of Construction-Related Impacts

Recommendations to mitigate and minimize potential short and long-term impacts are outlined in the guidelines and procedures. Short-term, construction-related impacts can generally be minimized through sound construction practices and various site specific control methods. Long-term impacts can be minimized through a combination of careful project design and site restoration measures.

5.0 Water Resource Requirements in Environmental Assessment Reports

The following water resource requirements shall be considered by proponents and reviewers during the preparation and review of EA reports:

(a) baseline data on the pre-construction conditions as they pertain to the quality and quantity of surface and groundwater;

(b) a description of the proposed undertaking and identification of potential impacts;

(c) an estimation of impact magnitude;

(d) a strategy for the implementation of mitigative measures;

(e) a rehabilitation plan for the site and/or route;

(f) a monitoring program for evaluating the effectiveness of construction-related mitigative measures and the rehabilitation plan; and

(g) summary statements on the above-mentioned water resources information shall be substantiated by valid references and/or data, and results of all analyses shall be verifiable.

6.0 Guideline Implementation

This guideline shall be implemented by:

(a) the Environmental Assessment Branch and the Approvals Branch of the Ministry during the review and preparation of EAs;

(b) the Regional Offices of the Ministry during field inspection and EA review.

GUIDELINE B-11
(formerly 15-12)

Evaluating Construction Activities -- Small Scale Construction Projects

Legislative Authority:

Ontario Water Resources Act
Environmental Protection Act

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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1.0 OBJECTIVE

2.0 APPLICATION

3.0 EFFECTS OF SMALL SCALE CONSTRUCTION

4.0 MITIGATION OF CONSTRUCTION-RELATED IMPACTS

5.0 GUIDELINE IMPLEMENTATION

SYNOPSIS

This guideline addresses water resource concerns related to small-scale construction projects. It was developed for use by proponents and Ministry staff. The intent is to provide assistance both in anticipating potential impacts and in planning adequate mitigative measures.

Detailed information is contained in Procedure B-6-1: "Evaluating Construction Activities Impacting on Water Resources (1994)".

1.0 Objective

The objective of this guideline is to ensure that good construction practices for small-scale construction projects are used to minimize sediment and chemical inputs into water courses, and that the physical and biological integrity of Ontario's waterbodies are protected in accordance with Guideline B-1; "Water Management -- Guidelines and Procedures of the Ministry of Environment and Energy".

2.0 Application

This guideline applies to all small scale construction projects such as those carried out by owners of cottages or waterfront property. The guideline shall be used by Ministry staff in their review of small-scale construction projects, and by proponents in the evaluation of water resources impacts, and the planning of mitigative measures.

3.0 Effects of Small Scale Construction

Short and long-term effects of construction on the aquatic environment may involve erosion and sedimentation, degradation of surface water quality, disruption of surface water quantity, damage to water- course beds and banks, and channel modification.

4.0 Mitigation of Construction-Related Impacts

Recommendations to mitigate and minimize potential short and long-term impacts are outlined Procedure B-6-1. Short-term, construction-related impacts can generally be minimized through sound construction practices and various site-specific control methods.

Long-term impacts can be minimized through a combination of careful project design and site restoration measures.

5.0 Guideline Implementation

This guideline will be implemented by the Regional Offices of the Ministry during field inspection and project reviews.

GUIDELINE B-12
(formerly 15-13)

Potable Water Storage Structures

Legislative Authority:

Ontario Water Resources Act, Section 52

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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4.0 MINISTRY REQUIREMENTS FOR MUNICIPAL AND COMMUNAL WATERWORKS

SYNOPSIS

This guideline establishes the requirement for the provision of covers for structures used for the storage of potable water. This requirement is necessary to ensure that water stored for human consumption remains free from contamination subsequent to treatment.

This guideline was written in support of Guideline B-5: "Drinking Water Quality" dealing with Drinking Water Quality in Ontario. Water for drinking and other domestic uses shall be safe, palatable and aesthetically appealing. It should be free from pathogenic organisms and hazardous levels of chemicals.

1.0 Definitions

Potable Water:

Water from ground or surface sources that is supplied for human consumption.

Potable Water Storage Structures:

A structure where potable water is stored for use by consumers.

2.0 Guideline Objective

The objective of this guideline is to ensure that stored potable water remains free of contamination after treatment.

3.0 Application

3.1 General

This guideline applies to all potable water storage structures supplied from waterworks operated by municipalities and others covered under the provisions of the *Ontario Water Resources Act,* Section 52.

3.2 Ministry Involvement

This guideline shall be used by Ministry staff when reviewing plans for new waterworks or for upgrading or expanding existing works.

4.0 Ministry Requirements for Municipal and Communal Waterworks

All existing and future potable water storage structures shall be completely covered to prevent contamination of the stored water. The type of cover shall be decided by the operating authority in consultation with its consulting engineers, and subject to the approval of the Director under the *Ontario Water Resources Act,* Section 52.

GUIDELINE B-13
(formerly 15-14)

Treatment Requirements for Municipal and Communal Waterworks Using Surface Water Sources

Legislative Authority:

Ontario Water Resources Act, Sections 10, 52 and 75

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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SYNOPSIS

This guideline describes the treatment that the Ministry shall require at municipal and communal waterworks using surface water as a source for potable water supplies. It provides technical guidance to municipalities and Ministry staff on the production of potable water from these sources.

The guideline was written in support of Guideline B-5: "Drinking Water Quality". The guideline applies to waterworks operated by municipalities and others as covered under the provisions of the *Ontario Water Resources Act,* Section 52. The main function of these works is to treat raw water from surface sources to produce potable water. Water transmitted with or without treatment to uncovered storage reservoirs shall be deemed to be surface water, and shall be subject to the requirements of this guideline.

1.0 Introduction

Water for drinking, culinary and other domestic uses shall be safe, palatable and aesthetically appealing. It shall be free from pathogenic organisms and hazardous levels of chemical and radioactive substances. Other aspects, such as corrosivity, tendency to form encrustations, and excessive soap consumption due to hardness should be controlled on the basis of economic considerations since they can interfere with the intended domestic use of the water.

Aesthetic considerations, such as colour, taste, odour, and turbidity, are factors which determine the quality of water and may also have an indirect health effect.

2.0 Turbidity

Turbidity is an expression of the optical property of a sample which causes light to be scattered and absorbed rather than transmitted in straight lines, and is caused by the presence of suspended matter such as algae, clay, rust, and bacteria.

Turbidity is measured using nephelometric turbidity units (NTU). One NTU is defined as 1/4000th of the turbidity of the formazin turbidity standard.

The formazin turbidity standard is prepared by dissolving 5 g of hydrazine sulphate and 50 g of hexamethylenetetramine in 1 litre of distilled water. The solution is allowed to stand for 48 hours.

Turbidity may interfere with the ability of a disinfectant to render pathogens harmless and may also transport associated trace contaminants. It is a significant health factor at values much lower than those where turbidity becomes an aesthetic consideration. By itself, filtration of surface raw water will rarely achieve suitably low turbidities.

Surface raw waters in Ontario generally do not meet the prescribed drinking water quality. They either continuously or seasonally exhibit turbidity in excess of the 1 NTU standard, as well as exceeding other limits.

In order to achieve the intent, quality and characteristics set out in the Ontario Drinking Water Objectives, certain treatment processes must be provided depending on the quality of the raw water source.

To reduce turbidity and provide basic public health protection, the treatment for surface waters will consist of chemically-assisted coagulation-flocculation, filtration and disinfection.

3.0 Guideline Objective

The objective of this guideline is to protect public health by ensuring that the quality of potable water produced from these works conforms to the intent and limits set out in the Ontario Drinking Water Objectives (Procedure B-5-1).

4.0 Ministry Requirements for Municipal and Communal Waterworks

All waterworks shall have acceptable raw water supply, source protection and treatment processes to ensure that the potable water produced meets the intent and the limits set out in the
Ontario Drinking Water Objectives.

5.0 Acceptability of Raw Water Supply

A sampling program with adequate analyses shall be carried out to establish the acceptability of the source supply and the raw water quality variations.

Analytical results shall accompany the application for a Certificate of Approval for a waterworks. The sampling program must be under the direction of Regional staff. The parameters to be analyzed shall be broadly based on the Ontario Drinking Water

Objectives. Analysis for additional parameters may be required at the discretion of Regional staff, based on the local potential for contamination, or where there exists a known discharge or other situation likely to contribute contaminants.

Analyses shall be completed by such methods and under such conditions as recommended by the Regional staff, after consultation with other Branches and Agencies when needed. Results of the analyses shall be made available to the public upon request.

Responsibility for the sampling program rests with the proponent. The Ministry, at its discretion, may assist in carrying out the sampling program.

6.0 Level of Treatment

All waterworks in the Province which utilize surface waters (e.g., lakes, rivers, streams) as a source of raw water shall use treatment processes consisting of coagulation-flocculation (by means of the application of approved chemical coagulants), filtration and disinfection, except as provided in Section 4.1 and in Procedure B-13-1: "Granting a Variance from the Treatment Requirements for Municipal and Communal Waterworks using Surface Water Sources".

Other treatment processes capable of producing potable water of equivalent or better quality will also be considered as acceptable alternatives.

6.1 Variance from Treatment Requirements

When it is considered that proper source protection exists and the source quality warrants a variance from the treatment requirements, exemptions may be recommended on a case-by-case basis in accordance with Procedure B-13-1.

No surface water supplies shall be provided for domestic consumption without effective disinfection.

6.2 Higher Treatment

Additional processes/higher levels of treatment may be required to produce potable water that consistently meets the requirements of the Ontario Drinking Water Objectives. Higher levels of treatment shall be justified by more intensive and appropriate site-specific sampling and analysis of raw water supply sources.

7.0 Review of Treatment Requirements

The level of treatment required for individual water- works shall be subject to periodic review by Ministry Regional Offices, as necessary, especially when expansions of waterworks are contemplated.

8.0 Drinking water objectives - compliance, assessment, and enforcement

A comprehensive monitoring program, including regular sampling of treated water and recording of flows, shall be undertaken by the works operating authority. This will permit assessment of compliance with the Ontario Drinking Water Objectives and, when necessary, initiation of appropriate remedial measures for works not in compliance.

The monitoring program requirements, along with appropriate follow-up procedures for responding to adverse water quality analysis results, are described in the Ontario Drinking Water Objectives. The Ministry, at its discretion, may assist in carrying out the monitoring program.

9.0 Variance from Policies and Guidelines

The concurrence of the Regional Director, and the Director of the Program Development Branch, must be received before any variance from the policies listed in Sections 4 through 8 and Procedure B-13-1, is granted.

10.0 Additional References

The following Ministry publications will serve as reference documents pertaining to technical details of treatment processes and requirements:

(a) "Guidelines for the Design of Water Treatment Works" (April, 1982); and

(b) "Chlorination of Potable Water Supplies" (Procedure B-13-3).

For details on the application for approval of waterworks, consult: "Guide for Applying for Approval of Municipal and Private Water and Sewage Works" (Procedure B-13-2)

PROCEDURE B-13-1
(formerly referenced by 15-14)

Granting a Variance from the Treatment Requirements for Municipal and Communal Waterworks Using Surface Water Sources

GRANTING A VARIANCE FROM THE TREATMENT REQUIREMENTS FOR MUNICIPAL AND COMMUNAL WATERWORKS USING SURFACE WATER SOURCES

A variance from the treatment requirements down to the minimum of disinfection may be permitted, but only after assessment of the water quality in relation to the Ontario Drinking Water Objectives together with social and economic factors has been considered and justified.

Whilst the Ministry recognizes the necessity of ensuring the protection of public health irrespective of system size, practicality determines the need for division of communal water works into two main categories. "Major" works are defined as those designed to serve a population equivalent of 500 persons or more. The remaining smaller systems are classified as "minor" works.

This eliminates as "major works" the large number of seasonal and "semi-public" supplies, which thus become governed by the guidelines for "minor works".

Two sets of guidelines have been developed reflecting two different approaches in the granting of variances from the treatment requirements:

- For "major" works, full treatment of coagulation-filtration-disinfection must be provided unless an exemption can be justified.

- For "minor" works, disinfection must first be provided; subsequent investigation must be carried out to determine if the need for coagulation and filtration can be demonstrated.

While the aforementioned approaches are different administratively, their goals are the same - i.e., to produce potable water meeting the intent and the limits set out in the "Ontario Drinking Water Objectives" in the most cost-effective way.

The following guidelines should be adhered to when seeking treatment requirements variances on a case-by-case basis. While it is recognized that flexibility may be exercised in the application of these guidelines under special circumstances to suit local constraints, any deviation from the guidelines should be properly justified by the proponent and agreed to by MOEE Regional staff.

A. Guidelines for "Major" Waterworks

1. A public meeting should be held to discuss reasons for possible variation from treatment requirements. Risk assessment of possible transmission of water-borne diseases or other adverse health effects, because of deletion of any basic water treatment step should be addressed and data made available for discussion. It will be the responsibility of the proponent to publish Notices of the public meeting and to provide a suitable meeting hall so that all affected by the decision may be heard.

   Guidance pertaining to public consultation should be obtained from the Ministry.

2. The proponent must notify the Medical Officer of Health of the intent to seek a variance from treatment requirements and to solicit his/her opinions.

3. A comprehensive sampling program must be done to establish raw water quality variations. One year of water quality data should be gathered and the sampling program should be under the direction of Regional staff and no sampling should be undertaken by the proponent until this matter has been discussed thoroughly with Regional staff. Samples should be taken at the proposed intake location(s) and in the distribution system (for existing works). The parameters to be analyzed should be broadly based on Procedure B-5-1: "Ontario Drinking Water Objectives" and be decided on cooperatively by the Regional Director and the Director, Program Development Branch. Analysis for additional parameters may be required based on the local potential for contamination, or where there exists a known discharge or other situation likely to contribute contaminants.

   Analyses should be completed by such methods, and under such conditions as recommended by the Regional Director, after consultation with other Branches of the Ministry when needed. Responsibility for the sampling program rests with the proponent. The Ministry, at its discretion may assist in carrying out the sampling program.

   Data from the sampling program together with the recommendations from the Regional Director, shall be submitted to the Director of

Approvals in support of the application for approval of the proposed undertaking as required under Section 52 of the Ontario Water Resources Act. The request for variance from treatment requirements must also have the concurrence of the Director of the Program Development Branch.

4. A treatability study may be required. A preliminary plant layout should be prepared and designed in such a way so as to ensure that adequate land is available in the event that additional treatment components are needed in future.

5. The water intake is to be located to minimize possible impact of adjacent piped discharges and surface run-off.

6. Areas of shallow water frequented by large concentrations of wild life (e.g., beavers) are not acceptable as a source of supply where chlorination only is proposed to be used.

7. The proponent is to indicate how the source is to be protected and to indicate present drainage basin use and contemplated land use.

If a conditional approval is granted and a variance from treatment requirements allowed, the following conditions should be fulfilled:

(a) Facilities should be provided to ensure free-residual chlorination. It will be necessary to establish that free-residual chlorination can be carried out under all conditions.

(b) The formation of total trihalomethanes should not exceed the maximum acceptable concentration as established in the Ontario Drinking Water Objectives.

(c) A sampling and reporting program satisfactory to the Regional Director shall be undertaken and maintained by the operating authority in order to monitor raw and/or treated water quality to ensure that the water supply system is producing water of an acceptable quality at all times. The sampling program, if different from the routine program as specified in the Ontario Drinking Water Objectives, may be written in the Certificate of Approval for the Works.

B. Guidelines for "Minor" Waterworks

1. For all "minor" water works, variance from treatment requirements down to the minimum of disinfection will be permitted at the outset. Regional staff, however, may require higher levels of treatment on site-specific cases based on proper justifications.

The following conditions should be fulfilled when a variance from treatment requirements is allowed:

(a) A comprehensive sampling program must be instituted under the direction of Regional staff to establish the treated water quality variation. Responsibility for the sampling program rests with the proponent. The Ministry, at its discretion, may assist in carrying out the sampling program. The sampling program may be written in the Certificate of Approval for the works. *If data indicate an exceedance of the Ontario Drinking Water Objectives, particularly the health-related ones, appropriate actions, including installation of higher level treatment processes, will be required.*

(b) Common sense precautionary measures such as those stated in Item Nos. 4 to 7 of "Guidelines for Major Waterworks" will apply.

GUIDELINE B-14
(formerly 15-15)

Treatment Requirements for Municipal and Communal Waterworks Using Groundwater Sources

Legislative Authority:

Ontario Water Resources Act, RSO 1990, Sections 10, 52 and 75

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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SYNOPSIS

This guideline describes the treatment that the Ministry shall require at municipal and communal waterworks using groundwater as a source for potable water supplies. It provides technical guidance to municipalities and Ministry staff on the production of potable water from these sources.

This guideline was written in support of Guideline B-5: "Drinking Water Quality". The guideline applies to waterworks operated by municipalities and others as covered under the provisions of the *Ontario Water Resources Act*, Section 52. The main function of these works is to treat raw water from ground sources to produce potable water.

Water originating from ground sources and transmitted with or without treatment to uncovered storage reservoirs is deemed not to be groundwater. Since such waters may be subject to similar contamination potentials as exist for surface water sources, this guideline is not applicable, and Guideline B-13: "Treatment Requirements for Municipal and Communal Waterworks Using Surface Water Sources", will apply.

1.0 Introduction

Water for drinking, culinary, and other domestic uses shall be safe, palatable and aesthetically appealing. It should be free from pathogenic organisms and hazardous levels of chemical and radioactive substances. Other aspects, such as corrosivity, tendency to form encrustations, and excessive soap consumption due to hardness should be controlled on the basis of economic considerations since they can interfere with the intended domestic use of the water.

Groundwater is usually of consistent quality and less susceptible to natural or anthropogenic pollution than surface water, but once contaminated, treatment is lengthy and problematic.

In order to achieve the intent, quality and characteristics set out in the Ontario Drinking Water Objectives, certain treatment processes should be provided depending on the quality of the raw water source.

To provide basic public health protection, the treatment of groundwaters will consist of continuous disinfection.

2.0 Guideline Objective

The objective of this guideline is to protect public health by ensuring that the quality of potable water produced from these works conforms to the guidelines set out in the Ontario Drinking Water Objectives.

3.0 Ministry Requirements for Municipal and Communal Waterworks

All waterworks shall have acceptable raw water supply, source protection and treatment processes to ensure that the potable water produced shall meet the guidelines set out in the Ontario Drinking Water Objectives.

4.0 Acceptability of Raw Water Supply

A sampling program with adequate analyses shall be carried out to establish the acceptability of the source supply and the raw water quality variations.

Analytical results shall accompany the application for a Certificate of Approval for a waterworks. The sampling program must be under the direction of Regional staff of the Ministry. The parameters to be analyzed shall be broadly based on the Ontario Drinking Water Objectives. In addition, analyses shall include total Kjeldahl nitrogen, ammonia, nitrite, nitrate, calcium, magnesium, potassium and silica (and hydrogen sulphide where its presence is detected). Analysis for additional parameters may be required at the discretion of Regional staff based on the local potential for contamination, or where there exists a known discharge or other situation likely to contribute contaminants.

Analyses shall be completed by such methods, and under such conditions, as recommended by the Regional staff, after consultation with other Branches of the Ministry. Results of the analyses shall be made available to the public upon request.

Responsibility for the sampling programs rests with the proponent. The Ministry, at its discretion, may assist in carrying out the sampling program.

5.0 Level of Treatment

All waterworks in the Province which utilize groundwaters as a source of raw water shall provide a treatment process consisting of disinfection.

Chlorination equipment and operation shall conform to the requirements set out in Procedure B--13-3: "Chlorination of Potable Water Supplies". Other disinfection processes capable of producing potable water of equivalent or better quality will also be considered as acceptable alternatives.

5.1 Variance from Treatment Requirements

Where it is considered that proper source protection exists and the source quality warrants a variance from the treatment requirements, exemptions may be recommended on a case-by-case basis, at the discretion of the Regional Director in accordance with Procedure B-14-1: "Granting a Variance from Treatment Requirements for Municipal and Communal Waterworks using Groundwater Sources".

5.2 Higher Treatment

Additional processes/higher levels of treatment may be required to produce potable water that consistently meets the requirements of the Ontario Drinking Water Objectives. Higher levels of treatment shall be justified by more intensive and appropriate site-specific sampling and analysis of raw water supply sources.

6.0 Review of Treatment Requirements

The level of treatment required for individual waterworks shall be subject to periodic review by Regional Offices, as necessary, especially when expansions of waterworks are contemplated.

More stringent treatment requirements may be needed as justified by site-specific sampling and analysis of raw water supply and delivered water.

7.0 Drinking Water Objectives - Compliance, Assessment and Enforcement

A comprehensive monitoring program, including regular sampling of delivered water and recording of flows, shall be undertaken by the works operating authority. This will permit assessment of compliance with Procedure B-5-1: "Ontario Drinking Water Objectives" and, when necessary, initiation of appropriate remedial measures for works not in compliance.

The monitoring program requirements, along with appropriate follow-up procedures for responding to adverse water quality results, are described in the Ontario Drinking Water Objectives. The Ministry, at its discretion, may assist in carrying out the monitoring program.

8.0 Variance from Policies and Guidelines

The concurrence of the Regional Director and the Director of the Program Development Branch must be received before any variance from the policies listed in Sections 3 to 7 and Procedure B-14-1, is granted.

9.0 Additional References

The following Ministry publications will serve as reference documents pertaining to technical details of treatment processes and requirements:

(a) "Guidelines for the Design of Water Treatment Works" (April, 1982);

(b) "Chlorination of Potable Water Supplies" (Procedure B-13-3); and

(c) "Design of Water Supply Systems for Small Residential Developments" (Procedure B-14-2).

For details on the application for approval of waterworks, consult: "Guide for Applying for Approval of Municipal and Private Water and Sewage Works" (Procedure B-13-2).

PROCEDURE B-14-1
(formerly referenced by 15-15)

Granting a Variance from the Treatment Requirements for Municipal and Communal Waterworks Using Groundwater Sources

GRANTING A VARIANCE FROM THE TREATMENT REQUIREMENTS FOR MUNICIPAL AND COMMUNAL WATERWORKS USING GROUNDWATER SOURCES

On a case-by-case basis, a variance from treatment requirements will be permitted, but only after assessment of the water quality in relation to the Ontario Drinking Water Objectives together with social and economic factors has been considered and justified.

The following guidelines should be adhered to when seeking a variance from treatment requirements. While it is recognized that flexibility may be exercised in the application of these guidelines under special circumstances to suit local constraints, any variance from these guidelines should be properly justified by the proponent and agreed to by MOEE Regional staff.

1. A public meeting should be held to discuss reasons for possible variance from treatment requirements. Risk assessment of possible transmission of water-borne diseases or other adverse health effects because of deletion of any basic water treatment step should be addressed and data made available for discussion. It will be the responsibility of the proponent to publish Notices of the public meeting and to provide a suitable meeting hall so that all affected by the decision may be heard. Guidance pertaining to public consultation should be obtained from the Ministry.

2. The proponent must notify the Medical Officer of Health of the intent to seek a variance from treatment requirements and to solicit his/her opinions.

3. A comprehensive sampling program must be developed to establish raw water quality variations. The sampling program must be under the direction of Regional staff and no sampling should be undertaken by the proponent until this matter has been discussed thoroughly with Regional staff.

   The well should be pumped at its proposed production rate for at least 48 hours and samples collected for analysis at 12-hour intervals to obtain firm data and to detect possible trends in water quality and maximum contaminant concentrations. If sufficient data are already available with respect to quantity and quality (e.g., replacement well, etc.), the pumping period and sampling may be reduced at the discretion of the Regional Director.

Parameters to be analyzed are to be decided on cooperatively by the Regional Director and the Director of Program Development Branch, and should be broadly based on the Ontario Drinking Water Objectives. Analysis for additional parameters may be required based on the local potential for contamination, or where there exists a known discharge or other situation likely to contribute contaminants.

Analyses should be completed by such methods, and under such conditions as recommended by the Regional Director, after consultation with other Branches of the Ministry when needed.

Responsibility for data collection rests with the proponent. The Ministry, at its discretion, may assist in carrying out the sampling and analysis program.

Data from the sampling program, together with the recommendations from the Regional Director, shall be submitted to the Director of the Approvals Branch in support of the application for approval of the proposed works as required under Section 52 of the Ontario Water Resources Act. The request for a variance from the treatment requirements must also have the concurrence from the Director of Program Development Branch.

If a conditional approval is granted and a variance from the treatment requirements allowed, the following conditions should be fulfilled:

(a) A preliminary plant layout based on the provision of 15 to 30 minutes of chlorine contact time may have to be done to ensure adequate land is acquired in the event that disinfection is needed in future.

(b) A sampling and reporting program satisfactory to the Regional Director shall be undertaken and maintained by the operating authority in order to monitor raw and delivered water quality to ensure that the water supply system is effective in producing water of an acceptable quality at all times. The monitoring program, if different from the routine program specified in the Ontario Drinking Water Objectives document, can be specified in the Conditional Certificate of Approval issued under Section 23 of the Ontario Water Resources Act.

(c) Facilities must be provided with complete standby disinfection equipment and disinfecting chemicals storage except:

(i) At the discretion of the Regional Director, exemptions from the requirement to provide complete standby disinfection equipment may

requirement to provide complete standby disinfection equipment may be permitted in multi-well supply systems operated by the same authority. Typically, one portable complete standby system should be supplied for every four wells.

(ii) At the discretion of the Regional Director and where exemption from providing disinfection equipment is obtained, exemption from providing on-site disinfecting chemical storage may be permitted in multi-well supply systems operated by the same authority, provided that approved disinfecting chemicals are readily available to that authority.

(d) As a precautionary measure, disinfection should be carried out for a period of time sufficient to establish an accurate raw water bacteriological quality data base.

GUIDELINE B-15
(formerly 11-01)

Use and Storage of Pesticides at Waterworks

Legislative Authority:

The Pesticides Act, RSO 1990, Section 4
The Ontario Water Resources Act, RSO 1990, Section 75(3)

Responsible Director:

Director, Standards Development Branch

Last Revision Date:

April, 1994

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SYNOPSIS

This guideline seeks to control the use of pesticides at waterworks in the interests of protecting potable water supplies. It supports Guideline B-5: "Drinking Water Quality", which states that water for domestic use should be safe, palatable and aesthetically pleasing, and free from any disease-causing organisms or hazardous concentrations of chemicals or radioactive substances.

This guideline does not apply to materials used in the treatment of water to achieve and maintain potability.

1.0 Definitions

Waterworks:

Waterworks means any works for the collection, production, treatment, storage, supply and distribution of water, or any part of such works, but does not include plumbing to which the *Building Code Act, 1992* applies.

Pesticide:

Any organism, substance or device used directly or indirectly to control, prevent, destroy, mitigate, attract or repel any pest, including: herbicides for use in the control of weeds; fungicides for the control of fungal organisms; insecticides for use in controlling lawn and garden insects and/or structural pests associated with the interior or exterior of waterworks facilities; and rodenticides for the control of rats or mice.

2.0 Requirements

2.1 General

The application and storage of pesticides is prohibited around, over, or in the immediate vicinity of waterworks. Of prime importance are: those facilities where reservoirs are open to the air and are located out-of-doors; covered in-ground reservoirs; reservoirs located within structures and used for storage, flocculation or clarification processes; or any part of the facility where there are open water areas, or sites with water wells, tile fields for water collection, or springs located on the premises.

2.2 Tank Filling

The filling of private mixing tanks for pesticide application by personnel not employed by the water treatment facility is prohibited on the premises of the waterworks. The filling of such tanks from off-premise hydrants shall not be done without the use of an approved back-flow preventer device or anti-suction device between the water hydrant and the mixing tank.

3.0 Exemptions from Guidelines

3.1 Rodent Control

Exempt is the acceptable use of rodenticides for rat and mouse control within and around waterworks by a licensed structural exterminator, under the supervision of the waterworks operator.

3.2 Public Health

Exempt is the use of pest control products applied in the interest of public health under the *Health Protection and Promotion Act* to control disease-causing pests, or the control of noxious weeds by an order issued under the *Weed Control Act*, or the use of chemical (micro-biological) agents for the control of microbes and bacteria. The application of all pest control products is to be carried out by a suitably licensed applicator.

3.3 Mechanical Devices

Exempt is the use of mechanical devices or apparatus which do not utilize any chemical agent.

3.4 Exempted Premises

Exempt is the use of pesticides on land or premises where there is no possibility of water contamination, such as elevated tanks, or premises where water is continuously under pressure and is enclosed in a pipe.

3.5 Notification

Where a water treatment facility is exempt, the plant operator will contact the Director under the *Pesticides Act* (Standards Development Branch) for approval, in writing, prior to the commencement of an extermination.

MANUAL OF GUIDELINES AND PROCEDURES

PART C - WASTE

December 31, 1994

PART C - WASTE

Chapter Contents

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GUIDELINE C-1
(formerly 14-01)

Mandatory or Discretionary Hearings on Waste Disposal Sites

Legislative Authority:

Environmental Protection Act, RSO 1990, Sections 30 to 32
Ontario Regulation 347 as amended by Ontario Regulation 457/93

Responsible Director:

Director, Approvals Branch

Last Revision Date:

April, 1994

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3.0 EMERGENCY SITUATION

SYNOPSIS

The primary purpose of this guideline is to describe when hearings on waste disposal sites are either mandatory or discretionary under Sections 30 and 32, Part V of the *Environmental Protection Act.* This guideline applies to new, and extensions to existing, waste disposal sites, and provides information for use by Ministry staff, applicants and the public with respect to whether a hearing is mandatory or discretionary.

1.0 Mandatory Hearings on Waste Disposal Sites

1.1 New Sites

All new waste disposal sites used for "final disposal" of any of the following materials will require mandatory hearings:

(a) liquid industrial wastes in any amounts;
(b) hazardous wastes in any amounts; or
(c) municipal waste produced by at least a 1,500 population equivalent.

"final disposal" means:

(a) the deposit of waste at a dump, not including the handling, storing, transferring, treating or processing of waste at a dump;
(b) the landfilling of waste; or
(c) the incineration of waste.

1.2 Exclusions

The operation of organic soil conditioning sites is not considered final disposal and is thus not subject to mandatory hearings.

1.3 Extension to Existing Sites

1.3.1 Liquid Industrial Wastes and Hazardous Wastes

Mandatory hearings shall be required in the case of extensions to waste disposal sites used for disposal of liquid industrial wastes or hazardous wastes in any amount, if such extensions were not provided for in the hearing at the time of the initial or subsequent certification.

1.3.2 Need for Increased Volume

Site owners are encouraged to consider the future need for increased volume at the time of initial certification to avoid unnecessary subsequent hearings.

1.3.3 Industrial Wastes Intended for Municipal Sites

A mandatory hearing is required in the case of extensions to sites approved for municipal waste when liquid industrial wastes and hazardous wastes are intended for disposal.

1.3.4 Municipal Waste

A mandatory hearing is required in the case of extensions to waste disposal sites for the purpose of accepting municipal waste if the increased waste load exceeds the 1,500 population equivalent. Operators of municipal sites are also encouraged to consider future needs as described in Section 1.3.2 above.

1.4 Hearing Arrangements

In the case of new sites or extensions to existing sites, recommendations to the Director are not necessary. Staff shall proceed automatically to arrange the hearing.

2.0 Discretionary Hearings

In all other cases, hearings are at the discretion of the Regional Director.

2.1 Factors for Regional Director to Consider

The Regional Director shall consider the following factors:

2.1.1 Hearings Normally Called

A hearing will normally be held if:

(a) a site is used to process, hold, condition or otherwise receive but not dispose of either liquid industrial wastes or hazardous wastes, unless sufficient justification is presented for not holding a hearing. As part of this justification, the Director shall consider the intent of the facilities. Facilities that are involved in the processing of wastes for 3Rs should be encouraged where the technology is proven and a proven market for the product is available;
(b) a transfer station will be used for extended storage for an indefinite period of time where there is no current approval for final disposal of the waste;
(c) a request, including reasons, is received from the council of the municipality in which the site is proposed to be located;
(d) a significant number of public requests are received; or
(e) the proposed use of land is inconsistent with official plans or zoning by-laws.

2.1.2 Hearings May be Called

A hearing may be called if:

(a) there is likely to be a significant off-site environmental impact;

(b) the site design or operation may require special evaluation; or
(c) other unanticipated factors suggest a hearing may be necessary.

2.2 Notification When Hearings Not Mandatory

In cases in which a hearing is not mandatory, the Regional Office shall normally notify the municipality, and anyone else who might be affected, by letter to request that comments on the matter be submitted to the Director. In reorganized municipalities and counties with county waste disposal sites or waste management systems, both levels of government shall be notified. If a disposal site is at or near a municipal boundary, the Regional Office shall consider advising the adjoining municipality.

2.3 Suggested Letter

A suggested letter for notifying a municipality about a proposed waste disposal site is provided.

3.0 Emergency Situation

Section 31 of the *Environmental Protection Act* provides for where, in the opinion of the Director, an emergency situation exists by reason of:

(a) danger to the health or safety of any person;

(b) impairment or immediate risk of impairment of the quality of the natural environment for any use that can be made of it; or

(c) injury or damage or immediate risk of injury or damage to any property or to any plant or animal life.

The emergency situation will be alleviated by the use, operation, establishment, alteration, enlargement or extension of a waste disposal site. The Director may issue a Certificate of Approval without requiring the Environmental Assessment Board to hold a hearing.

(UPPER TIER MUNICIPALITY - REGION/COUNTY)

Attention: Clerk

RE: (COMPANY NAME)'s Application for a Certificate of Approval for a (TYPE OF APPLICATION). File No. ******

The West Central Region of the Ministry of Environment and Energy has received an application from (COMPANY NAME) requesting the certification of a (TYPE OF APPLICATION) to be located at (SITE LOCATION). The company has requested approval to operate a (BRIEF DESCRIPTION OF PROPOSAL). We have attached a copy of the proponent's application for your information. Should you require additional detail with regard to this application, we suggest you contact the applicant directly at (APPLICANT'S PHONE #).

This application will be reviewed by this office. The Ministry would appreciate your comments on this application. We request your response with respect to this application within 30 days from **the date of this letter.** We will appreciate any preliminary comments you may have to offer us during the course of your application review process.

Please refer to File No. A****** in all related correspondence.

As you may be aware, the Director has discretion under Section 32, Part V of the *Environmental Protection Act* to hold a public hearing regarding applications for waste disposal facilities. If you wish to make comments with respect to the need or otherwise for a hearing, please write directly to this office, setting forth your reasons.

Should you have any questions or concerns you may contact (APPROVALS OFFICER) at (PHONE NUMBER).

Yours truly,

Chief
Approvals and Planning
West Central Region

Attach.

cc: ******** District Office, Ministry of Environment and Energy
(LOCAL TIER MUNICIPALITY - CITY/TOWN)
(APPLICANT)

GUIDELINE C-2
(formerly 14-02)

Participation in Hearings on Waste Disposal Sites

Legislative Authority:

Environmental Protection Act, RSO, Sections 5, 27, 30-34

Responsible Director:

Director, Legal Services Branch

Last Revision Date:

April, 1994

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2.5 Departures from Neutrality

SYNOPSIS

This guideline defines the maintenance of neutrality by the Ministry during the course of hearings on waste disposal sites and provides guidance to Ministry staff with respect to their participation in such hearings.

1.0 Definition

Certificate of Approval:

The authorization for the operation of a waste disposal site, including the terms or conditions of the certificate

2.0 Ministry Participation in Hearings on Waste Disposal Sites

2.1 Neutrality at Hearings

Neither the Ministry nor its Directors shall exhibit favour and support for an applicant in a hearing, nor shall they demonstrate, or appear to demonstrate, favour and support for interested parties in an application, unless specifically authorized.

2.2 Ministry Technical Reports

Ministry technical reports concerning the proposed site will be available to the Environmental Assessment Board and to all parties to the Hearing on an equal basis.

2.3 Testimony by Ministry Employees

Ministry employees who have expertise and information concerning the proposed site shall be available to testify at the request of the Environmental Assessment Board.

2.4 Expert Witnesses

Ministry expert witnesses may, when asked, testify based upon the conclusions reached within the limits of their expertise. They shall advise the hearing that such opinions are not necessarily those of the Ministry.

2.5 Departures from Neutrality

(a) If sufficiently strong reasons indicate a departure from neutrality, the Director's counsel shall advise the Environmental Assessment Board of this departure

(b) Where the Ministry has initiated an application for approval for a waste disposal site under the *Environmental Assessment Act*, the Ministry will of necessity become a proponent. Ministry employees will be required to depart from their position of neutrality in the normal discharge of their duties.

GUIDELINE C-3
(formerly 14-03)

Approval Responsibilities for Waste Disposal

Legislative Authority:

Environmental Protection Act, RSO 1990, Part V, Sections 27, 30, 31, 32 and 39

Responsible Director:

Director, Approvals Branch

Last Revision Date:

April, 1994

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SYNOPSIS

The primary purpose of this guideline is to define the approval responsibilities for waste disposal applications. This guideline informs applicants which official of the Ministry is responsible for the review of, and decision on, the issuance or refusal of a waste disposal Certificate of Approval.

Technical details regarding the approval of organic soil conditioning sites are provided in Procedure C-3-1: "Sewage Sludge Utilization on Agricultural Lands and C-3-2: "Utilization of Waste (other than Sewage Sludge) on Agricultural Lands".

1.0 Introduction

This guideline describes which Ministry officials normally exercise approval responsibilities for specified waste disposal sites and certain waste management systems.

2.0 Regional Director's Role

Within the limits of the respective Ministry regional boundaries, each Regional Director or designated alternate(s) shall assume responsibility as "The Director" for the processing of applications for waste disposal sites under Part V of the *Environmental Protection Act*, except where:

2.1 Exceptions

(a) a hearing on the applications is mandatory under Section 30 of the *EP Act*;

(b) the application is made with respect to an emergency situation, as defined under Section 31, for which a hearing would otherwise be required under Section 30;

(c) a hearing is to be held under Section 32 as may be determined through consultation between the respective Regional Director and the Director, Approvals Branch, in accordance with Guideline C-1: "Mandatory or Discretionary Hearings on Waste Disposal Sites";

(d) a Certificate of Approval was originally issued by the Director of the Approvals Branch pursuant to the exceptions 2.1(a), (b) or (c). This does not preclude the Regional Director from issuing a Certificate of Approval for a waste processing site or a transfer station at the same property.

2.1.1 When Hearings are Required

Where hearings are to be held, the Regional Director will notify the applicant in writing

as early as possible that:

(a) Approvals Branch shall co-ordinate the approval of the application; and

(b) the Director, Approvals Branch, shall implement the decision of the Board.

3.0 Director, Approvals Branch

All other applications not within the authority of the Regional Director as set out above shall continue to be the responsibility of the Director, Approvals Branch, or designated alternate(s).

4.0 Designated Regional Staff

District Managers and certain other Regional staff are designated as Directors for organic soil conditioning sites and organic waste management systems. If the system involves transportation for disposal at a site other than an organic soil conditioning site, the Approvals Branch shall handle the application as a waste management system.

Regional Directors shall ensure that:

(a) each District Manager deals only with applications for his or her District; and

(b) when the District Manager is unavailable, a replacement is designated in writing. The replacement shall be a Director for organic soil conditioning sites and organic waste management systems.

Where a hearing is to be held under Section 32 of the *EP Act*, the matter shall be dealt with by Approvals Branch, as set out above.

4.1 Technical Details

Technical details may be found in the two procedures: C-3-1, entitled "Sewage Sludge Utilization on Agricultural Lands" and C-3-2, entitled "Utilization of Waste (Other Than Sewage Sludge) on Agricultural Lands" and their successors.

5.0 Summary of Responsibilities

5.1 Director, Approvals Branch

(a) All applications concerning waste management systems, except organic waste management systems where the system involves transportation to an organic soil conditioning site.

(b) All applications concerning waste disposal sites which require a hearing, including:

(i) liquid industrial wastes;
(ii) hazardous wastes;

(iii)sites serving a population in excess of 1,500; and
(iv) all other sites where it is determined a hearing will be held.

(c) All applications concerning waste disposal sites where the applications are made with respect to an emergency situation, as defined in Section 31 of the *EP Act*, for which a hearing would otherwise be required.

5.2 Regional Directors and Designated Regional Staff

(a) Applications concerning organic waste management systems where the system involves transportation to an organic soil conditioning site.

(b) Applications concerning waste disposal sites which do not require a hearing, including:

(i) sites serving a population less than 1500;
(ii) organic soil conditioning sites; and
(iii)processing sites and transfer stations.

GUIDELINE C-4
(formerly 14-05)

The Management of Biomedical Waste in Ontario

Legislative Authority:

Environmental Protection Act, RSO 1990, Part V, Sections 19 and 27; Part XVII, Section 197

Responsible Director:

Director, Program Development

Last Revision Date:

April, 1994

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SCHEDULE 5A - Agents of Biomedical Animal Wastes
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SYNOPSIS

The primary purpose of this guideline is to clearly define biomedical waste and to specify handling and management requirements for this waste stream. The guideline is intended to ensure the proper and safe management of biomedical waste, prior to the promulgation of the necessary amendments to O. Regulation 347, and to provide direction to generators, carriers and receivers of biomedical waste, Ministry staff and the public when issues related to the management of biomedical waste arise.

The guideline will be enforced by including appropriate conditions on Certificates of Approval for carriers and receivers.

1.0 Introduction

Biomedical waste results from the provision of human or animal health care, related medical research and teaching, the operation of laboratories, morgues and funeral establishments, the use of biotechnology (such as the production and testing of vaccines), and from mobile health care activities.

Although these wastes represent less than ten percent of the wastes generated in health care, biomedical wastes present a hazard to public health and safety and, therefore, must be segregated and managed accordingly.

This guideline defines biomedical waste and provides guidance for the management of this waste stream, including criteria for handling, packaging, transportation, treatment and disposal.

2.0 Definitions

Biomedical Waste:

Waste that is generated by:

(A) human health care and residential facilities,

(B) animal health care facilities,

(C) medical research and medical teaching establishments,

(D) veterinary research and veterinary teaching establishments,

(E) health care teaching establishments for human health care,

(F) health care teaching establishments for animal health care,

(G) clinical testing or research laboratories,

(H) the professional office of a health professional within the meaning of the *Regulated Health Professions Act, 1991*,

(I) the professional office of a member of the College of Veterinarians of Ontario,

(J) mortuaries and funeral establishments, including any similar establishments for pets and other animals,

(K) facilities involved in the production and testing of vaccines,

(L) facilities involved in mobile health care for humans,

(M) facilities involved in mobile health care for animals.

Biomedical waste is limited to:

(a) human anatomical waste, consisting of tissues, organs and body parts, not including teeth, hair and nails;

(b) animal waste, consisting of all tissues, organs and body parts, carcasses, bedding, liquid blood or semi-liquid blood and blood products, items contaminated with blood that would release liquid or semi-liquid blood or blood products if compressed, body fluids visibly contaminated with blood and body fluids removed in the course of surgery, treatment or necropsy, unless determined by the generator, and so certified in writing by the generator, that the waste does not contain any of the agents listed in Schedule 5A (see Appendix 1);

(c) non-anatomical waste, limited to:

(c) (i) human and animal cultures, stocks or specimens, excluding urine and faeces submitted for analysis, live or attenuated vaccines, cell lines, and material that has come into contact with any of the items in this sub-clause;

(c) (ii) human liquid blood or semi-liquid blood and blood products, items contaminated with blood or blood products that would release liquid or semi-liquid blood if compressed, body fluids visibly contaminated with blood, and body fluids removed in the course of surgery, treatment, autopsy, embalming or for diagnosis, excluding urine and faeces;

(c) (iii) sharps including needles, needles attached to syringes, and blades; or

(c) (iv) broken glass or other materials which are capable of causing punctures or cuts and which have come into contact with human blood or body fluid or in contact with animal blood or animal body fluid unless determined by the generator, and so certified in writing by him or her,

that the waste does not contain any of the agents listed in Schedule 5A (see Appendix 1);

(d) other waste which:

(d) (i) is determined by the generator to require careful handling such as other biomedical waste received;

(d) (ii) has come into contact with a human or animal being treated for or suspected to be infected with one or more of the agents listed in Schedule 5B (see Appendix 1);

or

(d) (iii) is cytotoxic waste;

but does not include waste that is:

- from animal husbandry;
- domestic waste;
- controlled in accordance with the *Health of Animals Act* (Canada), the *Dead Animal Disposal Act* (Ontario), the *Meat Inspection Act* (Ontario), or the *Meat Inspection Act* (Canada); or
- generated in food production, general building maintenance or office administration at one of the facilities mentioned in clauses (A) to (M).

Cytotoxic Drugs:

Drugs possessing a specific destructive action designed specifically to destroy certain cells, including antineoplastic drugs that selectively kill dividing cells;

Cytotoxic Waste:

Waste cytotoxic drugs and includes: (a) leftover or unused cytotoxic drugs, and (b) tubing, tissues, needles, gloves and any other things which have come into contact with a cytotoxic drug;

Existing Hospital Incinerator:

An incinerator put into operation before the 31st day of December, 1985 and owned by a hospital within the meaning of the *Public Hospitals Act* at which biomedical waste, but no hauled liquid industrial waste or other hazardous waste, is incinerated;

Health Care Facilities:

Human health care and residential facilities and animal health care facilities;

"animal health care facilities" means veterinary hospitals and veterinary clinics;

"human health care and residential facilities" means the following facilities intended for the care of human beings:

(a) A hospital as defined in the *Public Hospitals Act* or in the *Community Psychiatric Hospitals Act.*

(b) A laboratory or specimen collection centre as defined in the *Laboratory and Specimen Collection Centre Licensing Act.*

(c) A private hospital as defined in the *Private Hospitals Act.*

(d) A psychiatric facility as defined in the *Mental Health Act.*

(e) A nursing home as defined in the *Nursing Homes Act.*

(f) A home as defined in the *Homes for the Aged and Rest Homes Act.*

(g) An approved charitable institution as defined in the *Charitable Institutions Act* that is approved, under that Act, as one of the following classes:

(g)(i) halfway houses where rehabilitative residential group care may be provided for adult persons;

(g)(ii) homes where residential group care may be provided for handicapped or convalescent adult persons, and

an approved charitable home for the aged.

(h) A facility designated by the regulations under the *Developmental Services Act* as a facility to which that Act applies.

(i) A facility where any of the following are provided: child development services or child treatment services, as defined in the *Child and Family Services Act*, or child and family intervention services, as defined in O. Regulation 70 (RRO 1990).

(j) A home for retarded persons as defined in the *Homes for Retarded Persons Act* other than an auxiliary home as defined in O. Regulation 635 (RRO 1990) where persons live in a supported independent living setting.

(k) A cancer centre established by the Ontario Cancer Treatment and Research Foundation under the *Cancer Act.*

(l) Independent health facilities within the meaning of the *Independent Health Facilities Act.*

Mobile Health Care:

Human or animal health care provided at a location which is not,

(a) a health care facility,

(b) the professional office of a health professional within the meaning of the *Regulated Health Professions Act, 1991*,

(c) the professional office of a member of the College of Veterinarians of Ontario.

Modified Biomedical Waste Incinerator:

An incinerator which is to undergo major modification to the incinerator and/or its air pollution control system, process or mode of operation.

New Biomedical Waste Incinerator:

An incinerator which was approved on or after January 23, 1989.

Sharps:

Medical or veterinary implements and equipment intended to be sharp for the purpose of cutting or piercing;

Treated Biomedical Waste:

Biomedical waste which has been treated utilizing the following treatment criteria:

(a) where the biomedical waste is comprised of the items described in (c)(i) of the definition of biomedical waste, treatment by autoclaving to the point of producing at least a 99.9999% reduction in spores of *bacillus stearothermophilus*;

(b) where the biomedical waste is not,

a biomedical waste mentioned in clause (a), or
human anatomical waste, animal waste, cytotoxic waste, or waste which has come into contact with a human or animal being treated for or suspected to be infected with one or more of the agents listed in Schedule 5B (see Appendix 1)

either,

(i) treatment by autoclaving to the point of producing at least a 99.99% reduction in spores of *bacillus stearothermophilus*, or

(ii) chemical treatment or thermal treatment, other than incineration or autoclaving, to the point of producing at least a 99.99% reduction in spores of *bacillus stearothermophilus* or *bacillus subtilis.*

3.0 Management of Biomedical Waste On-Site:

3.1 Segregation and Packaging

Generators shall undertake the necessary steps to ensure that biomedical waste is not placed in containers with other hospital wastes.

To minimize both the physical and biological hazard associated with waste sharps (needles, scalpels, blades, etc.), sharps shall be placed into a puncture-resistant leak-proof container dedicated specifically for that purpose. The sharps container shall have a lid which can not be removed once it has been permanently closed.

Generators of sharps shall be strongly discouraged from including disinfecting solutions or chemicals in sharps containers; the use of chemicals or disinfectants does not eliminate the biological and physical hazards associated with sharps, and additional treatment is still required.

The sharps container must be marked with the universal biohazard symbol displayed in Section 8 and labelled "Biomedical Waste/Déchets Biomédicaux".

Other biomedical waste shall be segregated into either a plastic bag or rigid container with a non-removable lid and labelled "Biomedical Waste/Déchets Biomédicaux". The container shall be capable of withstanding the weight of the biomedical waste without tearing, cracking or breaking.

All biomedical waste containers shall be colour-coded:

(a) red -- where the biomedical waste is being transported to an incineration facility; or

(b) yellow -- where the biomedical waste is being transported to a non-incineration facility.

3.2 Storage of Biomedical Waste

Human anatomical and animal anatomical waste stored by the generator shall be stored at a temperature at or below 4 degrees Celsius. Sharps and broken glass do not require refrigerated storage. Other non-anatomical wastes stored for greater than four days after generation shall also be stored as specified above.

Biomedical waste storage areas at a generator's site may include a permanent area specifically designed and constructed for the refrigerated storage of biomedical waste, or a stand-alone refrigeration/freezer unit. Biomedical waste storage areas are commonly located at or near the receiving area of the generator's site, which in many cases is in the vicinity of food supply and preparation areas. It is essential that biomedical waste storage areas are kept locked, except where authorized personnel are on hand.

The facility shall be clearly marked as being a biomedical waste storage area with a sign that is no smaller than 20 cm by 20 cm and which states "biomedical waste storage area" and "site d'entroposage des déchets biomédicaux" and has the universal biohazard symbol (see Section 8.0) clearly displayed.

Biomedical waste storage areas shall be physically separate from food preparation or supply areas of the facility. No materials other than biomedical waste shall be stored in the facility.

4.0 Transportation of Biomedical Waste Off-Site

4.1 General Requirements

Where the primary biomedical waste container is a sharps container or a rigid container with a non-removable lid, additional packaging or containment of the biomedical waste is not necessary for off-site transportation. The container shall be labelled and colour-coded in accordance with Section 3.0, above.

Where the primary container is a plastic bag, the bag shall be placed into a rigid outer-container for transportation off-site. The outer container may be a box, rigid container or reusable rigid container and should be leak-proof. The outer container must be labelled and colour-coded as specified in Section 3.0.

Prior to transportation off the generator's site biomedical waste containers shall be sealed, locked or closed such that no biomedical waste is likely to be released or discharged during transportation.

Reusable outer containers shall be cleaned with a disinfecting solution prior to reuse.

4.2 Where the Generator Transports Less than 5 Kilograms.

Where biomedical waste is to be transported off-site for treatment or disposal by the generator and the weight of the biomedical waste is less than 5 kilograms in total, the generator is exempt from the requirements of Sections 18 and 19 of O. Regulation 347 and Section 27 of the *Environmental Protection Act (EP Act)* as long as the biomedical waste is labelled and packaged in accordance with Sections 3.0 and 4.0 of this guideline, and,

(a) the biomedical waste is accompanied by a health care professional or worker in the health care industry or related industry who is trained for that purpose; and

(b) the generator maintains written records of the date, quantity and destination of the biomedical waste transported for a minimum of two years.

The generator may transport such biomedical waste to a facility licensed appropriately under the *EP Act* or to a biomedical waste generation facility which is willing to accept transported biomedical waste and deal with it appropriately.

4.3 Where the Generator Transports More than 5 Kilograms

When biomedical waste is to be transported off-site for treatment or disposal by the generator and the biomedical waste is 5 kilograms or more, Sections 18 and 19 of Regulation 347 and Section 27 of the *EP Act* apply. The generator shall obtain a Provisional Certificate of Approval for a waste management system issued under Part V of the *EP Act.*

The generator shall package the biomedical waste as stipulated in this guideline; all shipments shall require manifesting, and the biomedical waste shall only be transported to an existing hospital incinerator or a facility for which a Certificate of Approval has been issued which authorizes the acceptance of biomedical waste.

Where the generator is transporting biomedical waste to a hospital incinerator on the day in which the biomedical waste is scheduled for incineration, or the receiving facility has sufficient refrigerated storage capacity, the standards for biomedical waste transportation vehicles described below may be waived in the Certificate of Approval.

4.4 Vehicle Standards

The following biomedical waste transportation vehicle standards apply to: the generator which transports greater than 5 kilograms; all parties acting on behalf of a generator; and any third party biomedical transportation service where any or all types of biomedical waste are transported.

When only sharps are transported, these requirements may be waived in the Certificate of Approval permitting transportation.

All transportation vehicles shall be specially designed to accommodate the special interest to be served by the vehicle. The following features shall be provided in the storage compartment:

(a) The storage compartment shall be insulated and must be kept refrigerated at a temperature at or below 4 degrees Celsius.

(b) Walls and floor shall be metal surfaced to ensure effective cleaning and disinfecting.

(c) The floor shall be sealed and leak-proof. A liquid retaining lip shall be provided above the floor level at the door opening.

(d) No windows or ventilating openings shall open into the storage compartment.

(e) Only one lockable door shall provide access into the storage compartment.

(f) An interior light shall be provided.

(g) The universal biohazard symbol (see Section 8.0) shall be prominently displayed on the outside of the left and right vertical surfaces of the storage compartment.

(h) The vehicle shall not be used for any other purpose than transporting biomedical waste.

(i) The storage compartment door shall be kept locked at all times during transportation or when the vehicle is parked, except for normal entry.

(j) At the end of each day of operation, the interior compartment of the vehicle shall be thoroughly cleaned with a disinfecting solution.

5.0 Treatment and Disposal of Biomedical Waste

5.1 Incineration

In addition, incineration technologies shall be used to treat anatomical waste of human or animal origin which has come into contact with an individual being treated for or suspected to be infected with one or more of the agents listed in Schedule 5B of this Guideline: "Agents of "Other" Biomedical Wastes Requiring Special Handling", and for cytotoxic waste. These technologies must meet the requirements of Guideline A-1: "Combustion and Air Pollution Control Requirements for New Municipal and Biomedical Waste Incinerators".

5.2 Non-incineration

Non-incineration technologies may be used to treat other biomedical wastes. The technologies, other than autoclaves shall be capable of inactivating spores of *B. stearothermophilus* or *B. subtilis* by 99.99%. If the technology is an autoclave, it shall be capable of inactivating spores of *B. stearothermophilus* by 99.99%. The Ministry may establish other treatment criteria from time to time.

5.3 Discharge to Sanitary Sewer

A waste generator may discharge blood, blood products or body fluids from the waste generation facility into a sewage works subject to the Ontario Water Resources Act, or into a sewage works established before the 3rd day of April, 1957, or into a sewage system, as defined by Part VIII of the *EP Act*.

6.0 Biomedical Waste Treatment Facilities

6.1 On-Site Treatment

Where a biomedical waste treatment facility is located on a generator's site and meets the standards specified in Section 5.2 above, the facility is exempt from Sections 27, 40 and 41 of the *EP Act*. For each day the facility is in operation, it must keep a written record of the date, volume and final disposition of biomedical waste treated, including any biomedical waste accepted from generators operating under the exemptions described in Section 4.2 of this guideline. Such written records shall be kept by the treatment facility for a minimum of two years.

6.2 Off-site Treatment

Where a biomedical waste treatment facility is not located at the generator's site, and accepts off-site biomedical waste for treatment, Sections 27, 40 and 41 of the *EP Act* apply.

7.0 Final Disposal of Treated Biomedical Waste

7.1 Packaging for Final Disposal

Treated biomedical waste generated by the facility shall be stored separately from biomedical waste and other municipal waste.

Prior to leaving the site for final disposal, treated biomedical waste shall be packaged in a bag capable of withstanding the weight of the waste without tearing, cracking or breaking, or in a container that is rigid and puncture-resistant. Where the treated biomedical waste contains sharps which have not been shredded, a bag can not be used. The container shall be rigid and puncture-resistant. The package shall be clearly labelled "Treated Biomedical Waste" including the words "Not Hazardous" and "Certified". The operator of the site shall sign, near the word "Certified", to certify that the waste in the container or package has been subjected to appropriate treatment to render the contents of the bag or container treated biomedical waste.

7.2 Transportation for Final Disposal

Treated biomedical waste shall be transported, as directly as may be practicable, to the final disposal site. No other waste shall be transported in the vehicle with treated biomedical waste. Treated biomedical waste shall not be transported to a transfer station or other facility where final disposal will not take place.

The waste storage compartment of the vehicle shall be enclosed and must not be a compaction-type waste haulage vehicle. The vehicle shall have on hand, at all times, suitable emergency spill clean-up equipment.

Any treated biomedical waste which becomes loose or is in a container that is punctured, broken or leaking shall be immediately re-packaged in a suitable bag.

7.3 Landfilling of Treated Biomedical Waste

Treated biomedical waste shall be deposited at the landfill site only under the supervision of the operator of the site or a person designated by the operator. Persons operating site machinery or the transport truck are not considered supervisors for the purposes of this Section.

Once the treated biomedical waste is deposited in the site, a minimum of 125 centimetres of other waste or cover material shall be deposited over the treated biomedical waste. This ensures that direct contact between site equipment and treated biomedical waste is avoided.

APPENDIX 1

SCHEDULE 5A - AGENTS OF BIOMEDICAL ANIMAL WASTES

SCHEDULE 5B - AGENTS OF "OTHER" BIOMEDICAL WASTES REQUIRING SPECIAL HANDLING

Schedule 5A
Agents of Biomedical Animal Wastes

Bacteria

Bacillus anthracis
Brucella - all species
Francisella tularensis, type A (biovar tularensis)
M. tuberculosis
Pseudomonas malleri; P. pseudomallei
Yersinia pestis

Viruses

Arenaviridae
- Lymphocytic choriomeningitis virus, neurotropic strains

Bunyaviridae
- Unclassified Bunyavirus
  - Hantaan, Korean haemorrhagic fever and epidemic nephrosis viruses

Herpesviridae
- Gammaherpesvirinae
  - Genus Rhadinovirus: Herpesvirus ateles; Herpesvirus saimiri

Retroviridae
- Oncovirinae
  - Genus Oncornavirus C
    - Human T-cell leukaemia/lymphoma virus (HTLV-I, HTLV-II,if cultured)
  - Genus Oncornavirus D
    - Mason-Pfizer monkey virus
    - Viruses from primates
- Lentivirinae
  - Human immunodeficiency viruses (HIV - all isolates if cultured)

Rhabdoviridae
- Genus Vesiculovirus
  - Piry
- Genus Lyssavirus
  - Rabies, street virus

Togaviridae
- Genus Alphavirus
  - Eastern equine encephalitis virus
  - Chikungunya (recent isolates)
  - Venezuelan equine encephalitis (except Strain TC-83)

Unclassified Viruses
- Chronic infectious neuropathic agents (CHINAs)
  - Kuru, Creutzfeldt-Jakob agent (also listed under Level 2; level of the suspected agent depends on the nature of the manipulations and the amount of sera, bio/necropsy materials handled)

Arenaviridae
- Lassa, Junin, Machupo viruses

Bunyaviridae
- Genus Nairovirus
  - Crimean-Congo haemorrhagic fever

Filoviridae
- Marburg virus
- Ebola virus

Flaviviridae
- Tick-borne encephalitis complex, including -
  - Russian Spring-Summer Encephalitis
  - Kyasanur forest virus
  - Omsk haemorrhagic fever virus

Herpesviridae
- Alphaherpesvirinae
  - Genus Simplexvirus: Herpes B virus (Monkey B virus)

Poxviridae
- Genus Orthopoxvirinae
  - Variola
  - Monkeypox

Parasites

Echinococcus (gravid segments)

Schedule 5B

Agents of "Other" Biomedical Wastes Requiring Special Handling

Bacteria

Rickettsi
- Coxiella burnetii

Viruses

Arenaviridae
- Lassa, Junin, Machupo viruses

Bunyaviridae
- Genus Nairovirus
  - Crimean-Congo haemorrhagic fever

Filoviridae
- Marburg virus
- Ebola virus

Flaviviridae
- Tick-borne encephalitis complex, including -
  - Russian Spring-Summer Encephalitis
  - Kyasanur forest virus
  - Omsk haemorrhagic fever virus

Herpesviridae
- Alphaherpesvirinae
  - Genus Simplexvirus: Herpes B virus (Monkey B virus)

Poxviridae
- Genus Orthopoxvirinae
  - Variola
  - Monkeypox

APPENDIX 2

UNIVERSAL BIOHAZARD SYMBOL

Universal Biohazard Symbol

The actual symbol shall be no smaller than 10 cm by 10 cm and no larger than 40 cm by 40 cm. Unless otherwise specified, the width of the symbol should be approximately one quarter the width of the surface on which it appears. The symbol and its background must be in contrasting colours.

GUIDELINE C-5
(formerly 14-06)

Registration on Title of Certificates of Approval for Waste Disposal Sites

Legislative Authority:

Environmental Protection Act, RSO 1990, PartV, Sections 19 and 27, Part XVII, Section 197

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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SYNOPSIS

The primary purpose of this guideline is to ensure that members of the public have access to information about municipally or privately-owned lands used for waste disposal sites. The guideline covers the registration on title of Certificates of Approval and Provisional Certificates of Approval for existing and new waste disposal sites in which waste is disposed on or in the ground, other than soil conditioning sites.

The guideline will be enforced by placing conditions on applicable Certificates of Approval.

1.0 Objective

This guideline is designed to ensure that members of the public have access to information about municipally or privately-owned land used for waste disposal sites which pose potential hazards.

1.1 Present or Future Disposal Sites

This guideline applies to all existing and new waste disposal sites in which waste is disposed on or in the ground (other than soil conditioning sites).

1.2 Past Disposal Sites

This guideline does not apply to abandoned waste disposal sites (certified or uncertified) unless specific safety hazards noted in Section 2, below, have been identified.

1.3 Sites on Unpatented Crown Land

This guideline does not apply to sites located on unpatented Crown land. Policy LM7.04.01 of the Ministry of Natural Resources requires MNR District Managers to advise the MOEE of the location of all existing and closed waste disposal sites on public lands and to ensure that the identified areas are marked on all pertinent maps.

2.0 Potential Hazards from Waste Disposal Sites

Potential hazards associated with waste disposal sites include:

(a) contamination of ground and surface water;
(b) methane gas production and migration;
(c) leachate (liquid) production and migration;
(d) land subsidence due to waste settling and decomposition; and
(e) other hazards.

3.0 Registration on Title

Requirements imposed by a Director upon any waste disposal site as conditions in a Certificate or Provisional Certificate of Approval become part of the Certificate or Provisional Certificate of Approval.

3.1 Section 19(1) *EP Act*

Conditions in a Certificate of Approval bind the successor or assignee of the interest in the land.

3.2 Registration

Registration on title shall be implemented by the Director requiring the Certificate holder to follow the appropriate registry procedure of either:

(a) *The Land Titles Act*; or
(b) *The Registry Act.*

3.3 Section 197, *EP Act*

A control document affecting land can require that the land not be sold unless the purchaser is first notified of the problem by being given a copy of the control document; such a requirement can be registered on title (a form to be used for such registration has been prescribed by O. Reg. 14/92 and O. Reg. 15/92 of the *EP Act* and *Ontario Water Resources Act*, respectively); a purchaser of land can void the purchase if the purchaser was not given a copy of the control document as required (*EP Act*, Section 197). [Note: The requirement that land not be sold without a warning would not be effective when the land is owned by a corporation and a new owner buys the shares of the corporation; presumably, persons conducting business such as this can protect themselves.]

4.0 Buffer Zones

The following provisions shall apply to buffer zones surrounding waste disposal sites.

4.1 Operating Waste Disposal Sites

Registration on title of buffer zones shall be required for all buffer zones owned by the owner or operator of the waste disposal site. Where buffer zones are not owned by the owner or operator of the site, the owner or operator of the site shall be required by the Director to carry out a study of the potential hazards and implement remedial measures.

4.2 New Waste Disposal Sites

The buffer zones for all new waste disposal sites shall be owned by the owner or operator of the site and shall be registered on title as in Section 3 above prior to certification. Other

registered interests in land intended for buffer zones, such as easements, may be sufficient in some cases in place of ownership.

5.0 Abandoned Waste Disposal Sites

When potential hazards noted under Section 2 above have been identified at abandoned waste disposal sites, the following measures may be employed to notify the public of the hazards:

5.1 Director's Actions

The Director may

(a) issue an order and require registration on title as in Section 3 above; or

(b) encourage the municipality to take appropriate steps with respect to official plans, restricted area (zoning) by-laws, subdivision controls and severance controls; or

(c) offer advice on remedial measures to property owners.

5.2 Municipalities' Actions

Municipalities may control potential hazards by invoking the measures under Section 5.1(b) and (c) above, or by municipal ownership of the property.

GUIDELINE C-6
(formerly 14-07)

Handling, Transportation and Disposal of Asbestos Waste in Bulk

Legislative Authority:

Environmental Protection Act, RSO 1990, Section 27
Ontario Regulation 347, Section 17

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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4.0 APPLICATION

5.0 DESIGN AND OPERATIONAL STANDARDS

5.1 Industrial Waste Transported using an Industrial Vacuum Loader

5.2 Asbestos Waste Transported in Bulk using a "Lugger-Box" Type Container

SYNOPSIS

The primary purpose of this guideline is to provide basic standards for the assessment of vehicles, equipment and procedures used for the collection, transportation and disposal of asbestos waste in bulk. The guideline is intended for use by operators of bulk asbestos waste handling and transportation systems, and by Ministry staff during their review and assessment of Certificate of Approval applications for bulk asbestos waste systems and during their monitoring of such systems.

1.0 Introduction

O. Regulation 347 permits the disposal of asbestos waste in any landfill site approved for the disposal of municipal waste. In addition to allowing this disposal method, the Regulation imposes standards for waste handling, packaging, transportation, vehicles and disposal sites.

2.0 Definition

Asbestos waste in bulk:

Asbestos waste that is handled in reusable rigid containers that are part of the collection vehicle and that, when lined, use a single impermeable liner.

3.0 Purpose

This guideline provides a consistent basis for the review and operation of waste management systems that handle asbestos waste in bulk.

4.0 Application

This guideline is intended for use by equipment owners as a basis for the operation of bulk handling systems. In addition, it is for use by Approvals Branch and Regional Operations staff during their review of applications for Certificates of Approval and during the monitoring of bulk asbestos handling systems. O. Regulation 347 and Section 27 of the *Environmental Protection Act* require Ministry approval of these systems. Alternative waste management techniques may be used when they are consistent with the overall intent of the guidelines.

5.0 Design and Operational Standards

All applicable provisions for the management of asbestos waste presented in O. Regulation 347 must be followed, including the following provisions:

(a) Asbestos waste in bulk must be transported by means of a waste management system operating under a Certificate of Approval or Provisional Certificate of Approval that specifically authorizes the transportation of asbestos waste in bulk.

(b) Asbestos waste should be transported directly to a landfill site at which the operator has been informed in advance of the quantity of the waste and the approximate time of arrival.

The following specific requirements deal with: asbestos waste transported using an industrial vacuum loader; and asbestos waste transported in bulk using a lugger-box type container.

5.1 Asbestos Waste Transported Using an Industrial Vacuum Loader

Most asbestos wastes are generated when insulation or fireproofing materials are removed from equipment or buildings. These wastes can be removed manually by scraping or brushing, or by using high-pressure water. Removal of asbestos by any of these methods usually involves the use of water to lower the friability of asbestos and minimize the amount of fibres which may become airborne. Surfactants can be added to the water to improve wetting and increase penetration.

Industrial vacuum loaders may be used to collect asbestos removed by any of these methods. In general, industrial vacuum loaders consist of a blower preceded by particulate removal equipment and a debris or waste collection box. The vacuum induced by the blower is used to draw the asbestos waste into the debris box through a hose/boom arrangement.

The following standards apply to the design and operation of vacuum systems that handle asbestos in bulk:

(a) All asbestos waste shall be wetted either during or prior to collection.

(b) All vacuum systems shall be equipped with particulate removal equipment to minimize asbestos emissions from the blower exhaust. In most cases, asbestos emissions from vacuum systems shall not exceed the one-half hour average guideline of 5 $\mu g/m^3$ for total asbestos at the point-of-impingement.

To enable operators to interpret this one-half hour average guideline, (Provisional) Certificates of Approval will include a condition specifying the minimum distance required between the vacuum unit and the nearest receptor. A provision will also be included in the condition to give the Regional Director the discretion to set aside this minimum distance where it can be shown to be either unnecessarily restrictive or not restrictive enough. In those cases where the minimum distance cannot be maintained, changing the work location of the vacuum unit or cordoning-off the work area shall be considered.

Emission data for the unit shall be submitted with the application for a Certificate of Approval under Section 27 of the *EP Act*.

(c) All equipment shall be operated and maintained in accordance with the manufacturer's specifications. These specifications shall be submitted to the Ministry for review at the time application is made under Section 27 of the *EP Act.*

(d) Emission control equipment shall not be bypassed. In the event of equipment malfunction, asbestos removal operations shall be immediately terminated. The local District Office of the Ministry shall be notified, promptly, of any emissions to the atmosphere of asbestos fibres that may exceed the Ministry guideline.

(e) Asbestos shall be discharged directly from the collection/transportation vehicle to a depression that has been specifically prepared at the landfill site to receive the wetted asbestos waste. Care shall be taken to minimize any spillage outside of the prepared depression.

(f) To minimize spillage and splashing of wet asbestos, a chute shall be provided for discharging asbestos waste from the vehicle into the depression.

(g) Any large quantities of dry asbestos wastes found in the vehicle during the disposal operation shall be immediately wetted in the vehicle to minimize the emission of fibres to the atmosphere.

(h) The operator shall wear protective equipment while wetting asbestos waste as specified in Section 5.1(g) (above).

(i) At the end of the disposal operation, the exterior of the truck and the chute shall be thoroughly washed, if required, to remove any spillage or splashback resulting from the waste discharge. All washwater must be directed to the prepared depression.

(j) All filter bags, included as part of the particulate removal equipment, shall be disposed of at the site with the asbestos waste to ensure that contaminated bags are not reused for other vacuum service.

(k) Following the disposal and vehicle cleaning operation, a 125 cm layer of garbage or other cover material shall be promptly placed on the asbestos waste to avoid direct contact with landfill equipment.

Sufficient absorbent material should be applied to absorb free liquid before the placement of the 125 cm layer of cover material. Since the intent is to provide a stable base for site compaction equipment, materials such as earth and sand are acceptable.

5.2 Asbestos Waste Transported in Bulk using a "Lugger-Box" Type Container

Asbestos wastes are also generated by industrial operations, such as the manufacture of friction pads for automobile and truck brake shoes. Asbestos wastes from these operations can include off-specification product, floor sweepings and fibre collected from baghouses or other air cleaning devices. In general, off-specification products and floor sweepings should be handled in polyethylene bags, in accordance with requirements found in O. Regulation

347. Bulk asbestos waste generated from baghouses or other particulate removal equipment may be handled with a "lugger-box" type container. The following additional standards shall apply for these systems:

(a) The lugger-box container shall be lined with a polyethylene bag that is at least 6/1000" and that is sufficiently durable to ensure that punctures, tears or leaks do not develop during handling, transportation or disposal. When the loading operation is completed, the polyethylene bag shall be securely closed and sealed. Air displaced from these bags by dry asbestos during filling, shall be vented back to control equipment to minimize fibre emissions.

(b) In those cases where the asbestos wastes have been pelletized or otherwise prepared to eliminate friability and the potential for emission of fibres to the atmosphere, a liner that can be overlapped and sealed to cover the asbestos may be used in place of polyethylene bags. The liner shall ensure that there is no contact between the pelletized asbestos and the lugger-box. The liner must be at least 6/1000" and sufficiently durable to ensure that punctures or tears do not develop during handling, transportation and disposal.

(c) To minimize the freezing of bags and liners to containers during the winter (that may result in tearing during unloading), lugger-boxes shall be covered or otherwise protected against precipitation.

(d) Lugger-boxes shall be covered during transportation with a suitable tarpaulin or net to ensure that the load is properly secured.

(e) Asbestos shall be discharged directly from the collection/transportation vehicle to a depression that has been specifically prepared at the landfill site to receive the asbestos waste. Care shall be taken to minimize any spillage outside of the prepared depression.

(f) The polyethylene liner or bag shall be disposed of in the landfill with the contained asbestos waste.

(g) To minimize the breaking of bags referred to in Section 5.2 (a) above, a chute shall be provided, as required, to slide the waste into the depression in the landfill.site.

(h) The empty lugger-box and the exterior of the truck shall be thoroughly washed, as required, to remove asbestos waste residues. All washwater must be directed to the prepared depression.

(i) Following the disposal and vehicle cleaning operation, a 125 cm layer of garbage or other cover material shall be promptly placed over the asbestos waste to avoid direct contact with landfill equipment.

Sufficient material shall be applied to absorb free liquid before the placement of the 125 cm layer of cover material. Since the intent is to provide a stable base for site compaction equipment, materials such as earth and sand are acceptable.

GUIDELINE C-7
(formerly 14-08)

Burning at Landfill Sites

Legislative Authority:

Environmental Protection Act, RSO 1990, Sections 6, 14 and 27
Ontario Regulation 347, Sections 1 and 12.1

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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2.0 GENERAL REQUIREMENTS

2.1 Other Agencies

2.2 Certificate of Approval

3.0 OPERATIONAL REQUIREMENTS

SYNOPSIS

The primary purpose of this guideline is to provide a set of operational requirements for the orderly burning of segregated clean wood and brush in a safe and environmentally-acceptable manner at appropriate landfill sites. This guideline is intended for use by landfill operators in their operation of a landfill site, and by Ministry staff during their review and inspection of landfill operations. The operational requirements are provided in Section 4-21, "Open Burning of Waste", of Procedure C-8-1: "Guidance Manual for Landfill Sites Receiving Municipal Waste" (C-8-1).

The guideline shall be enforced by including appropriate conditions on a Certificate of Approval for a landfill site, and by the Regions during the normal course of their activities.

1.0 Introduction

The burning of muncipal waste, except for a limited number of specific materials, is prohibited by O. Regulation 347, Section 12.1. Segregated clean wood and brush, however, may be burned at certain sites, subject to certain requirements. These requirements are detailed in Section 4.21 of Procedure C-8-1: "Guidance Manual for Landfill Sites Receiving Municipal Waste".

2.0 General Requirements

As part of an overall program to maximize waste capacity at existing landfill sites, thereby extending their life, burning of clean wood and brush may be allowed under strictly controlled conditions.

2.1 Other Agencies

The Ministry of Natural Resources and local municipal authorities shall be consulted to obtain any necessary permits. Specific regulations enforced by the Ministry of Natural Resources shall be complied with for burning wood and brush at landfills located north of Ontario's fire line.

2.2 Certificate of Approval

Burning of any kind is not permitted at new landfill sites unless specifically allowed in the Certificate of Approval.

3.0 Operational Requirements

The operational requirements are detailed under Section 4.21.3 of the guidance manual under the headings of:

(a) Weather and Atmospheric Conditions,
(b) Supervision,
(c) Environmental Controls,
(d) Extinguishing Requirements,
(e) Access Control, and
(f) Resolution of Complaints.

GUIDELINE C-8
(formerly 14-09)

Use of the "Guidance Manual for Landfill Sites Receiving Municipal Waste"

Legislative Authority:

Environmental Protection Act, RSO 1990, Part V
Ontario Regulation 347

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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1.0 INTRODUCTION

2.0 APPLICABILITY

3.0 PURPOSE

SYNOPSIS

This guideline authorizes the use of Procedure C-8-1: "Guidance Manual for Landfill Sites Receiving Municipal Waste" in activities involving the design, development, operation and closure of landfill sites receiving municipal waste. It is intended for the use and benefit of the owners and operators of landfills (both publicly and privately owned), regulatory authorities (including the Ministry), and consultants and members of the public.

1.0 Introduction

The document "Guidance Manual for Landfill Sites Receiving Municipal Waste" (C-8-1) provides a clear description of the process by which landfill sites receiving municipal waste are to be designed, developed, operated and closed.

2.0 Applicability

The Guidance Manual is applicable to landfill sites that are to receive or are receiving municipal waste. Municipal waste includes domestic waste and non-hazardous solid wastes from industrial, commercial and institutional sectors. Landfill sites, at all times, shall operate in compliance with their respective Certificates of Approval.

3.0 Purpose

The Guidance Manual is intended for the use and information of the owners and operators of landfills (both publicly and privately owned sites), regulatory authorities including the Ministry, consultants and members of the public concerned about or interested in landfilling practices.

The Manual is not intended as a "design document", but rather provides guidance on provincial requirements and good waste management practices.

GUIDELINE C-9
(formerly 14-11)

Approval of Waste Management Systems for Dust Suppression using a Waste Material

Legislative Authority:

Environmental Protection Act, RSO 1990, Sections 27 and 32
Ontario Regulation 347, Sections 2 and 5

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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1.0 INTRODUCTION

2.0 DEFINITIONS

3.0 APPLICATIONS FOR CERTIFICATES OF APPROVAL

4.0 INFORMATION REQUIRED IN APPLICATIONS

5.0 HEARING REQUIREMENTS

SYNOPSIS

The primary purpose of this guideline is to control the use of waste material as a dust suppressant through the issuance of Certificates of Approval. The guideline applies to carriers applying wastes as dust suppressants. Sites receiving wastes as dust suppressants are exempt from certification, provided the site and wastes are identified in the carrier's Certificate of Approval.

This guideline shall be enforced through the following mechanisms. The Program Development Branch will determine whether a proposed dust suppressant is a waste. The Regions will require a proponent to apply for a Certificate of Approval for a dust suppressant system using a waste. The Approvals Branch will review applications and issue (or refuse to issue) Certificates of Approval with appropriate conditions.

1.0 Introduction

Ministry approval for carriers applying waste as a dust suppressant is required under Section 2 of O. Regulation 347 and Section 27 of the *Environmental Protection Act (EP Act)*. Under Section 5(2) of O. Regulation 347, sites receiving dust suppressants are exempt from certification requirements, provided that the site and wastes are identified in the carrier's Certificate of Approval.

2.0 Definitions

Dust Suppressant:

A waste used for dust suppression in accordance with a Certificate of Approval or Provisional Certificate of Approval for a dust suppression waste management system

Dust Suppression Site:

A waste disposal site where a dust suppressant is deposited

3.0 Applications for Certificates of Approval

Carriers proposing to handle wastes for use as dust suppressants shall make an application for a Certificate of Approval. The Certificate of Approval, if issued, shall identify the classes of wastes to be used, as well as the allowed dust suppression sites. Dust suppression sites included in the Certificate of Approval for a waste management system do not require Certificates of Approval for waste disposal sites.

4.0 Information Required in Applications

The following general information shall be required for the review and issuance of a Certificate of Approval:

(a) liability insurance for a minimum of $1,000,000;
(b) number and types of vehicles;
(c) vehicle licence plate and serial numbers, year, make and model;
(d) list of waste classes to be transported;
(e) analytical data on the wastes;
(f) sources of wastes (generic or specific);
(g) list of receivers (dust suppression sites) to be used;
(h) areas of service (such as Counties of Ontario, Michigan, etc.), where wastes will be obtained;
(i) company registration information;
(j) company operational procedures;
(k) company driver training program; and
(l) any additional detailed information that may be required in specific cases.

5.0 Hearing Requirements

Section 32 of the *Environmental Protection Act* states that hearings for the approval of waste management systems are discretionary. For new operations, hearings shall not normally be held unless there are significant environmental concerns that require open public discussion.

PROCEDURE C-10
(formerly 14-12)

Removal Procedures at Sites Containing Substantial Quantities of Asbestos Waste

Legislative Authority:

Environmental Protection Act, RSO 1990, Sections 6, 13, 14, 15, 46
Ontario Regulation 347, Section 17

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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6.0 OPERATIONAL PROCEDURES

6.1 Preparation
6.2 Determination of Asbestos, Location and Quantity
6.3 Dust Suppression
6.4 Packaging of Waste
6.5 Site Security
6.6 Personnel Safety
6.7 Ambient Air Monitoring

SYNOPSIS

The primary purpose of this procedure is the protection of the environment during the removal of asbestos waste from sites designated for redevelopment or other purposes. The procedure applies to sites containing substantial quantities of asbestos waste. It should be used in conjunction with O. Regulation 347, the *Occupational Health and Safety Act*, Guideline C-6: "Handling, Transportation and Disposal of Asbestos Waste in Bulk", and Guideline C-15: "Decommissioning and Clean-Up of Sites" (under revision).

The procedure is intended for the use and benefit of Ministry staff, project proponents and the public when dealing with the proposed and actual removal or management of substantial quantities of asbestos wastes at sites containing such wastes.

1.0 Introduction

There may be occasions when sites containing substantial quantities of asbestos waste will be redeveloped for other potential uses, and require excavation.

Asbestos is hazardous when airborne, thus any excavation of buried asbestos waste must be undertaken with special care. Where possible, every effort should be made to allow known deposits of asbestos waste to remain untouched.

However, in cases where it is necessary to disturb the deposits, the this procedure should be followed so that the asbestos can be removed, transported and disposed of elsewhere in a safe and proper manner.

2.0 Purpose

This procedure is intended for the use and benefit of Ministry staff, project proponents and the public when dealing with the subject of the removal or management of substantial quantities of asbestos wastes at sites undergoing redevelopment for other purposes.

3.0 Applicability

Sites would include landfill sites where asbestos waste has been deposited, tailings disposal areas containing asbestos and industrial or other sites where asbestos is present.

4.0 Other Requirements

This procedure should be used in conjunction with O. Regulation 347, Guideline C-6: "Handling, Transportation and Disposal of Asbestos Waste in Bulk", Guideline C-15: "Decommissioning and Clean-Up of Sites", and the *Occupational Health and Safety Act* administered by the Ministry of Labour.

This procedure is intended as a complement to common sense, good judgment and past

practical experience in the management of asbestos waste. Alternative or modified techniques may be used where updated technology or experience allows, and where they are consistent with the overall intent of the procedure and are acceptable to officials of the Ministry.

5.0 Regulatory Requirements and Conditions

5.1 Ministry Approval

If the site to be redeveloped was used for the disposal of waste within the preceding 25 years, the proponent shall seek approval from the Minister in accordance with Section 46 of Part V of the *Environmental Protection Act (EP Act).*

Prior to such approval being granted for any site containing asbestos, Ministry staff will evaluate the proponent's proposal. Such conditions as deemed necessary by Ministry staff shall be applied to subsequent Ministerial approval, if such is given.

5.2 Conditions for Approval

The following conditions shall be applied to all approvals.

(a) The Ministry of Labour, the Municipality, and the Medical Office of Health will be informed of the project.

(b) The asbestos waste will be excavated and moved in accordance with O. Regulation 347 under the *EP Act,* and under the *Occupational Health and Safety Act*, particularly O. Regulation 838, entitled "Designated Substance - Asbestos on Construction Projects and in Building and Repair Operations".

(c) The waste removed shall be deposited in an approved disposal site in accordance with O. Regulation 347, and recorded on the site plan of the new site.

(d) Monitoring and analyses of collected samples shall be conducted in a manner satisfactory to Ministry staff.

(e) Transportation to, and reception of the excavated asbestos waste at, a landfill site shall be conducted under that site's Certificate of Approval.

6.0 Operational Procedures:

6.1 Preparation

The proponent shall retain a recognized consultant who is experienced in earth-moving operations and in the handling of asbestos material or waste. The consultant shall have an understanding of all current regulations regarding asbestos and of the analytical procedures and equipment used in the monitoring of asbestos air emissions. The consultant shall supervise all aspects of the project.

6.2 Determination of Asbestos, Location and Quantity

The presence and location of asbestos deposits in a site must be determined, as far as possible, by a search of the site deed, from Ministry records of abandoned and active waste disposal sites, and from the site owner/operator or any other sources deemed appropriate.

As past site records may not be precise, the proponent's consultant shall determine the quantity of asbestos to be removed by drilling a grid pattern of boreholes using appropriate safety procedures and analyzing the samples for asbestos in the area of the site identified by records or other means as containing asbestos.

Excavation of the asbestos area shall include the removal of approximately 30 centimetres of soil proved to be asbestos-free in all directions surrounding the asbestos deposit. The total excavation quantity will then include both the asbestos deposit and surrounding earth as defined above.

6.3 Dust Suppression

Earth and waste asbestos at the point of excavation shall be pre-wetted and kept in an appropriately wet condition by water sprays during all phases of the operations to eliminate visible dust emissions. Care shall be taken not to cause run-offs. If water sprays are manual in operation, provision to maintain wetting when work is not in progress (e.g., overnight) can be made by installation of irrigation- type sprinklers to be run either full-time or cycled automatically by the timed electrical control of a pump or valve.

All roadways and tracks on the reclamation site shall be kept wet during the excavation operations. Acceptable commercially available dust suppressants may be used on roadways; the type, application rate, etc., to be in keeping with with the aim of eliminating visible dust emissions.

Prior to leaving the reclamation site, vehicles loaded with asbestos waste shall be cleaned. At minimum, this shall consist of a thorough hosing.

6.4 Packaging of Waste

Excavated asbestos waste shall be properly packaged for transportation in accordance with the provisions of Section 17 of O. Regulation 347. Vehicles used for transporting the waste shall be placarded and identified in accordance with Section 17, paragraph 6 of the Regulation, and any other applicable federal and provincial transportation regulations.

6.5 Site Security

Sites in the process of excavation shall be provided with both passive and active security if left unattended overnight. Signs denoting the danger of the sites shall be installed on such occasions. In addition, security personnel shall frequently monitor the sites to eliminate intentional or unintentional trespassing. Asbestos excavation locations shall be completely encircled by snow fence or equivalent fencing when unattended.

If sites are to be left unattended for longer periods, the asbestos excavation location shall be covered with uncontaminated soil or such other material deemed appropriate to prevent migration of asbestos fibres from the location.

6.6 Personnel Safety

All personnel working on the operations shall be protected by the use of respirators and clothing as necessary or as directed by the consultant or Ministry of Labour staff. The requirements of the *Occupational Health and Safety Act* and its regulations shall be adhered to by all personnel involved in the operations.

6.7 Ambient Air Monitoring

Ambient air at the worksite shall be monitored according to standard Ministry procedures, and the results evaluated against the Ministry primary criteria for ambient air of 0.04 asbestos fibres of length greater than 5 μm per cubic centimetre of air.

(a) In addition, samples shall be taken around the fence perimeter of the site(s). The number of samples will be determined by the consultant and reviewed by Ministry personnel. Results shall be evaluated in accordance with the above Ministry primary guideline for asbestos in ambient air.

(b) Should visible emissions occur on site, remedial measures shall be taken. The consultant shall maintain a log of such events that records the time, duration, location, probable cause and remedial measures applied. Copies of the log shall be made available to the Ministry. The log data shall be reviewed and compared with pertinent asbestos analytical data to ascertain if a relationship between the visible emission and asbestos fibre counts exists.

(c) All analytical results shall be forwarded to the Ministry Regional Director as soon as possible.

(d) Post-removal air monitoring of the excavation site shall be conducted in a manner and frequency as determined by the Ministry Regional Director.

GUIDELINE C-11
(formerly 14-13)

Handling and Disposal of Selected Wastes from Retail Motor Vehicle Servicing Facilities

Legislative Authority:

Environmental Protection Act, RSO 1990, Part V
Ontario Regulation 347, Section 1

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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1.0 INTRODUCTION

2.0 DEFINITION

3.0 APPLICATION

4.0 THE HANDLING AND DISPOSAL OF SELECTED LIQUID WASTES

SYNOPSIS

The primary purpose of this guideline is to describe the recommended handling and disposal procedures for certain wastes from retail motor vehicle servicing facilities. The service station operator has a responsibility to ensure that the station's wastes are handled and disposed of with proper care. O. Regulation 347 exempts a service station operator from manifest and registration requirements provided that the operator has a current written agreement for the collection and management of the station's wastes with a carrier approved under Part V of the *Environmental Protection Act* for the operation of a waste management system.

This guideline is intended to be used by service station operators and by Regional Operations Division staff in reviewing the waste management practices at service stations. This guideline was prepared in co-operation with industry associations and is intended to promote the proper management of wastes.

1.0 Introduction

O. Regulation 347 exempts retail automobile service stations from the requirements to manifest and register their wastes, provided they have a current written agreement for the collection and management of their wastes with a carrier approved under Part V of the *Environmental Protection Act*.

This guideline and the associated procedure (C-11-1) describe the recommended handling and disposal practices for certain wastes from retail motor vehicle servicing facilities.

2.0 Definition

Retail Motor Vehicle Servicing Facility:

Retail gasoline service stations, retail automotive repair garages, retail car washes and retail service centres at automobile dealerships; this includes service centres for:

(a) mufflers,
(b) brakes,
(c) body repair,
(d) undercoating,
(e) snowmobiles, and
(f) pleasure boats.

3.0 Application

The guideline and procedure are intended for use by service station operators and by staff of the Regional Operations Division when reviewing the waste management practices at service stations.

4.0 The Handling and Disposal of Selected Liquid Wastes

Procedure C-11-1 provides recommended handling and disposal practices for the following wastes from retail motor vehicle servicing facilities:

(a) used lubricating oil;
(b) interceptor wastes;
(c) water pump-out from underground gasoline storage tanks; and
(d) waste batteries

PROCEDURE C-11-1
(formerly referenced by 14-13)

Procedures for the Handling and Disposal of Selected Wastes from Retail Motor Vehicle Servicing Facilities

Procedures for the Handling and Disposal of Selected Wastes from Retail Motor Vehicle Servicing Facilities

Introduction

This document was prepared in cooperation with the Ontario Petroleum Association (OPA) and Automotive Afteruse Retailers of Ontario (AARO) to promote the proper management of liquid wastes generated from retail motor vehicle servicing facilities (including retail gasoline service stations, retail automotive repair garages, retail car washes, and retail service centres at automobile dealerships).

The document includes recommended operating practices for facilities at service stations (servicing facilities) from which these liquids are removed for disposal. It also stresses the need to ensure proper waste disposal by using carriers and disposal facilities approved by the Ontario Ministry of Environment and Energy (MOEE).

The service station operator has a responsibility to ensure that his wastes are handled and disposed of with proper care. In order to be exempt from manifest and registration requirements, the service station operator must have a current written agreement for the collection and management of his wastes with a carrier approved under Part V of the *Environmental Protection Act* for the operation of a waste management system. Failure to have such an agreement would result in the loss of this exemption, leading to requirements for generator registration and the use of manifests for these wastes. The service station operator **must** at all times have this agreement available for inspection by an Ontario Ministry of Environment and Energy inspector.

The agreement between the service station and the carrier must include the following information:

Service Station

- service station name,
- company affiliation, if applicable,
- site location, full address,
- full mailing address, if it differs from the site location,
- operator's full name.

Carrier

- carrier's name,
- full address,
- waste management system Certificate of Approval number,
- name of primary contact person.

Other Information

- length of time agreement in effect,
- wastes covered by agreement,
- minimum time intervals between pick-ups to match those in this guideline,
- intended receiver of waste(s), including full site address and Certificate of Approval number.

Recommended Practices for Used Lubricating Oil

1. All used oil generated at the station must be stored in a tank specifically designed and used exclusively for that purpose. Disposal of non-petroleum products into the used oil storage tank is not an acceptable practice.

2. The used oil storage tank should be tightly and securely capped and water content minimized.

3. The service station operator should arrange for pick-up of used oil as necessary with a used oil carrier approved by the Ontario Ministry of Environment and Energy.

4. The service station operator is responsible for ensuring that the used oil is sent to a waste management facility approved by the Ontario Ministry of Environment and Energy to accept this class of waste. As a general practice, the Ministry and the petroleum industry encourage operators to send used oil from service stations to re-refining facilities for the protection of the environment and conservation of resources.

5. Used oil must not be used in combustion systems unless specific approval to do so is given by the Ontario Ministry of Environment and Energy under Section 9 of the *Environmental Protection Act.*

6. The operator must prevent the entry of oil into sewer systems, drains and the natural environment.

7. Spills or other discharges to the environment must be reported immediately to the Ministry, to the municipality, and where appropriate, to the service station operator's company affiliate.

SERVICE STATION INTERCEPTORS

Service stations are normally equipped with interceptors (oil-water separators). Interceptors receive all service bay drainage and retain the oily (hydrocarbon) wastes and solids. This is a gravity separation system with oil and grease (hydrocarbons) rising, and solids settling as a sludge. Oily water (effluent) passes through several compartments, repeating the oil/water separation process. The water phase ultimately passes to municipal sanitary sewers or to a septic system in a rural setting. Discharge of water from the interceptor to an open ditch,

ground or waterway requires prior approval under Section 53 of the *Ontario Water Resources Act*. Properly designed and maintained, interceptors can provide up to 98% removal of oil and solids from the original mixture.

Routine Inspection:

Routine inspection by the service station operator can vary with the amount and type of service bay activity but should be undertaken **at least** once every three months. The following procedures are recommended:

1. Measure the amount of accumulated oil and solids in the first compartment to determine if a clean-out is required.

2. Inspect the last compartment to ensure that the water being directed to municipal sewers does not contain solids or oils and greases (hydrocarbons).

Management Criteria:

1. Servicing and clean-out of the separator is required when the oil collected reaches a level of 10 cm. (4 inches) or if the solids at the bottom reach a depth of 30 cm. (12 inches).

2. Servicing is also required promptly following any spill that results in a significant quantity of contaminants entering the interceptor.

3. The interval between interceptor clean-outs should never exceed 12 months, regardless of the amounts of oil or solids collected.

Recommended Servicing Procedures:

1. Clean-out should be carried out by an Ontario Ministry of Environment and Energy approved carrier using a power vacuum unit.

2. Clean-out is accomplished by applying suction near the top of the oil layer in the first compartment until it is completely removed, then proceeding directly to the sludge layer and removing same.

3. The intermediate water layer is left (or should be replaced) to act as a seal.

4. The other chamber(s) should also be checked to ensure no significant quantity of oil or sludge is present.

5. The interceptor should be inspected by the operator immediately after servicing to ensure that it has been properly cleaned and that the water level has been restored for operation.

6. The service station operator is responsible for ensuring that the waste - both oil and solids - which is removed from his interceptor, is taken to a waste management

facility approved by the Ministry to handle this class of wastes. Such facilities would include, but are not limited to, waste oil processors/recyclers, waste transfer stations and sewage treatment plants. Operators should ensure that wastes taken to sewage treatment plants comply with all municipal sewer use by-laws.

Recommended Operating Procedures:

1. Compartment covers must be tightly sealed to ensure that all floor drainage is directed to the first compartment.

2. Water must be maintained at normal operating levels to retain the seal and prevent oil from leaving the first compartment.

3. No changes can be made to the piping or baffles in the interceptor except as approved by the manufacturer or a design engineer.

4. No gasoline, gasoline contaminated products, cleaning solvents, anti-freeze, windshield washing fluids or wastewaters containing surfactants from exterior washing of vehicles should be intentionally sent to the interceptor.

Records:

Records must be kept on the particulars and dates of inspections, clean outs and spills.

WATER PUMP OUT FROM UNDERGROUND GASOLINE STORAGE TANKS

The *Ontario Gasoline Handling Act* requires that service station operators dip their underground product storage tanks for accumulated water content on a daily basis.

The presence of water in a tank can occur from

- condensation of water vapour,
- surface water run-off entering the fill-pipe.

Operator Requirements:

1. Service station operators must dip all underground storage tanks for water on a daily basis.

2. If water is detected in any underground tank to a depth of 5 cm. or more, the operator should contact his supplying company and report water content.

3. The services of an approved petroleum equipment maintenance contractor should be engaged to pump out the water contaminant.

4. Small quantities of contaminated water (up to 100 litres) may be placed in the used-oil storage tank. This practice should be minimized in keeping with the recommendations for used oil and to minimize the potential for flashing as a result of excessive gasoline content in the used oil storage tank.

5. Quantities in excess of 100 litres will be collected in tanks or drums and transported to a marketing terminal or refinery for treatment in a gravity separator followed by a conventional secondary biological treatment plant.

6. In the event that a terminal or refinery facility does not exist in the area, contaminated water must be taken to an approved waste management facility such as a sewage treatment plant for treatment or destruction. The service station operator is responsible for ensuring that the chosen waste management facility has the necessary Certificate of Approval enabling it to handle this class of waste and that the facility has agreed to accept the waste.

7. Contaminated water from underground storage tanks must **NOT** be discharged into the station oil-water interceptor, nor to the storm sewer. The contaminated water may not be sent to a sanitary sewer unless it meets the specifications in the municipal sewer use by-laws and any other applicable municipal requirements.

8. It is a primary requirement that service station operators will maintain the fill-box and fill-cap on all underground storage tanks to minimize water contamination from surface run-off.

RECOMMENDED PRACTICE FOR THE DISPOSAL OF WASTE BATTERIES

The following practices are recommended for the disposal of waste batteries:

1. Waste batteries must be handled by a waste battery reclaiming facility approved by the Ontario Ministry.

2. Precautions should be taken to ensure that leakage does not occur from batteries that are stored on-site, pending disposal. Storage areas should be curbed or otherwise designed to retain any acid that may leak.

GUIDELINE C-12
(formerly 14-14)

Training of Drivers of Liquid Industrial or Hazardous Waste Transportation Vehicles

Legislative Authority:

Environmental Protection Act, RSO 1990, Section 27 *Ontario Regulation 347*, Sections 16(7) and 16(9)

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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SYNOPSIS

The primary purpose of this guideline is to outline the essential components of training programs for drivers of vehicles used for the transportation of liquid industrial or hazardous wastes. It applies to operators of waste management systems and is intended to be used by them in designing their driver training programs. The guideline is also to be used by staff of the Regional Operations Division in evaluating waste management system applications and during discussions with operators of waste management. The components of a driver training program are provided in Procedure C-12-1: "An Outline of the Essential Components of Training Programs for Drivers of Liquid Industrial and Hazardous Waste Transportation Vehicles".

This guideline will be enforced by staff of the Regional Operations Division (Regions and Approvals Branch) during the evaluation of applications for new or revised waste management system Certificates of Approval and by staff of the Division (Regions and Investigations and Enforcement Branch) during the normal course of their activities.

1.0 Introduction

This guideline and Procedure C-12-1: "An Outline of the Essential Components of Training Programs for Drivers of Liquid Industrial and Hazardous Waste Transportation Vehicles" outline the essential components of training programs for drivers of vehicles used for the transportation of liquid industrial or hazardous wastes.

2.0 Definition

Driver training program:

A training program designed specifically for drivers of vehicles used for the transportation of liquid industrial or hazardous wastes

3.0 Application

3.1 Application Outside the Ministry

This guideline and Procedure C-12-1 are intended for use by operators of waste management systems in designing their driver training programs or in evaluating driver training programs offered by outside training organizations.

3.2 Application Within the Ministry

The guideline and procedure shall be used by staff of the Regional Operations Division (Regions and Approvals Branch) in evaluating applications for new or revised waste

management system Certificates of Approval and during discussions with operators of waste management systems on the components of a driver training program.

4.0 Waste Management System Certificates of Approval

The driver training program requirement shall be included in all waste management system Certificates of Approval for the transportation of liquid industrial or hazardous wastes, as follows:

4.1 Applications for Certificates of Approval

An application for a Certificate of Approval shall include written confirmation that the operator has a driver training program in place which addresses the five required areas of training as described in the procedure and required under Section 16(9) of O. Regulation 347, as well as written confirmation that all current and future drivers will be trained in accordance with the procedure and Section 16(9) of O. Regulation 347.

4.2 Conditions Included on Certificates of Approval

Condition(s) related to driver training shall be attached to the Certificate of Approval, a copy of which must be kept in the vehicle at all times. The condition(s) shall include the following requirement: Every driver must carry a copy of his/her Certificate of Training at all times when operating or in any way tending a waste transportation vehicle.

5.0 Essential Components of Training Programs

Procedure C-12-1 provides an outline of the essential components of training programs for drivers of vehicles used for the transportation of liquid industrial or hazardous wastes. The five areas of training are:

(a) the operation of the vehicle and waste management equipment;
(b) relevant waste management legislation, regulations and guidelines;
(c) major environmental concerns for the waste is to be handled;
(d) occupational health and safety concerns for the waste(s) to be handled; and
(e) emergency management procedures.

Upon completion of the training program, the driver must be able to demonstrate complete familiarity in the areas identified in the procedure.

PROCEDURE C-12-1
(formerly referenced by 14-14)

An Outline of the Essential Components of Training Programs for Drivers of Liquid Industrial and Hazardous Waste Transportation Vehicles

AN OUTLINE OF THE ESSENTIAL COMPONENTS OF TRAINING PROGRAMS FOR DRIVERS OF LIQUID INDUSTRIAL AND HAZARDOUS WASTE VEHICLES

Introduction

Regulation 347 has been designed to ensure that liquid industrial and hazardous wastes are effectively managed from generator to carrier to receiver. To provide this necessary control the regulation includes detailed definitions for liquid industrial and hazardous wastes and an effective waste manifest system. In addition, the regulation establishes specific responsibility for each of the three parties involved in any waste transaction. Guideline C-12 and this procedure deal with one of the major responsibilities for carriers: driver training.

Regulation 347 requires that drivers of vehicles used for the transportation of liquid industrial or hazardous wastes must be trained in the following five areas:

i) the operation of the vehicle and waste management equipment,
ii) relevant waste management legislation, regulations and guidelines,
iii) major environmental concerns for the waste to be handled,
iv) occupational health and safety concerns for the waste to be handled, and
v) emergency management procedures.

The responsibility for providing driver training rests with operators of companies involved in the transportation of either liquid industrial or hazardous wastes. The guideline and procedure have been prepared to assist these operators (carriers) in the design and assessment of training programs given to their drivers. It can also be used as a syllabus either by carriers or by specialized training organizations involved in the design and offering of effective training programs.

For most hazardous wastes, the guideline is not intended to require carriers to provide a training program in addition to the program specified under the federal *Transportation of Dangerous Goods Act* (TDGA) or the provincial *Dangerous Goods Transportation Act*. The two transport and environment training programs can be integrated into one program. Although training under *TDGA* is for the most part, sufficient to ensure compliance with Regulation 309, training is required in the following additional areas to ensure full compliance:

- relevant waste management legislation, policies and guidelines,
- major environmental concerns for the wastes to be handled.

For liquid industrial wastes and for those hazardous wastes not covered by the *Transportation of Dangerous Goods Act* such as Leachate Toxic and Severely Toxic Wastes, training programs should follow this guideline.

Because of the varied nature of the waste management industry, programs will have to be tailored to meet the needs of individual companies. In some cases, it may be necessary for carriers to train beyond the areas identified by the guideline where there exists an important

environmental or occupational health concern.

COMPLIANCE

Operators of companies transporting liquid industrial and hazardous wastes must obtain a waste management system Certificate of Approval for their complete operations under Section 27 of the *Environmental Protection Act*. These Certificates of Approval specify the classes of waste that can be handled by the company and any other conditions of operation.

Information to be supplied concerning driver training

When applying for either a new or a revised waste management system Certificate of Approval, for the transportation of liquid industrial wastes, the operator must provide written confirmation that he/she has an acceptable driver training program in place which addresses the five items contained in this Procedure, in accordance with Regulation 347.

At the same time, the operator must also provide the Ministry with a list confirming the names of trained drivers in his/her employ at the time of application.

Conditions applied to Certificate of Approval with respect to Driver Training

Conditions respecting driver training will be incorporated in the Certificate of Approval, a copy of which must be kept in the vehicle at all times. The conditions will apply the following requirements:

i) every driver must carry a copy of his/her Certificate of Training at all times when operating or in any way tending a waste transportation vehicle;

ii) an individual who has not successfully completed a driver training program is prohibited from operating or in any way tending a waste transportation vehicle except as part of an approved training program, in the course of which he/she must be under the direct supervision of a trained driver at all times;

iii) A waste management system operator must maintain, at the operator's place of business, a list of the trained drivers in his/her employ, and must make such list available for Ministry inspection upon request.

I. REQUIRED AREAS OF TRAINING

This section deals with the driver training requirements specified in Regulation 347.

Upon completion of the training program, the driver must be able to demonstrate complete familiarity in the areas identified below.

1) **The Operation of the Vehicle and Waste Management Equipment**

a) the operation of all waste management vehicles that the driver is likely to operate and/or all prevailing models commonly in use by the carrier;

b) the location, function and operation of all controls for waste management equipment (pumps, valves, gauges, etc.) and any of their emergency features;

c) the proper loading and unloading procedures for the common types of wastes handled by the carrier (acids, solvents, used oils, sludges, etc.) in both drum and bulk shipments;

d) the following manufacturer's specifications for the vehicle:

- maximum capacity
- dimensions,

- material of construction.

2) **Relevant Legislation**

a) a general understanding of the following provisions in the *Environmental Protection Act*:
   - the approvals requirements,
   - penalties for improper management.

b) an understanding of the following Regulation 347 requirements important to drivers:
   - locking requirements for valves when the driver is not in attendance;
   - responsibility of driver to be in attendance during loading or unloading, unless an operator from the generator's or receiver's site is present;
   - documentation requirements (Certificates of Approval and manifests);
   - requirements for the manifest to be complete with no obvious errors at the time of a waste transfer;
   - registration requirements for waste generators;
   - all safety mark/placarding requirements under TDGA;
   - requirement for vehicles to be leak-proof and covered where necessary to prevent odours or other emissions from the vehicle.

c) an awareness of other applicable legislation for the wastes handled by the carrier such as Ontario Regulation 362 (Waste Management - PCBs), Part X of the *Environmental Protection Act* (Spills), the *Dangerous Goods Transportation Act (Ontario)*, the *Transportation of Dangerous Goods Act (Canada)* (and regulations thereunder) and the *Occupational Health and Safety Act*.

3) **Major Environmental Concerns**

a) a knowledge of the characteristics of waste dangerous goods as defined under the *Transportation of Dangerous Goods Act* (corrosive, flammable, infectious, etc.);

b) a knowledge of the characteristics of liquid industrial, leachate toxic and severely toxic wastes as defined under Ontario Regulation 347;

c) a knowledge of the physical properties of subject wastes to be handled by the driver which affect its hazard and disposal options (liquid, solid, slurry, or gas);

d) a knowledge of the potential effects on the environment of subject wastes to be handled by the driver;

e) a knowledge of compatibilities of subject wastes to be handled by the driver.

The information for specific wastes required under subsections (d) and (e) above can be supplied to drivers at the time of each waste transfer.

4) **Occupational Health and Safety Concerns**

a) responsibilities of all parties as prescribed under the *Occupational Health and Safety Act*:

b) relationship between a waste's characteristic (corrosivity, toxicity, etc.) and the nature and degree of injury that could result from inhalation, ingestion and skin contact as well as any emergency action required;

c) protective measures and equipment to be used to prevent inhalation, ingestion and skin contact with wastes of different characteristics;

d) the function, location, and use of safety equipment carried in the unit, including the fire extinguisher, protective clothing and respiratory equipment.

The information for specific wastes required under subsections (b) and (c) above can be supplied to drivers at the time of each waste transfer.

5) **Emergency Management Procedures**

a) procedures for handling wastes during emergencies and location of any emergency features on operating equipment;

b) initial response required from the driver in the event of an accident involving various types of wastes;

c) emergency call requirements (under Section 92 of the *Environmental Protection Act*) in the event of a spill;

d) need to comply with the entire notification requirements in the Transportation of Dangerous Goods Regulation;

e) in particular, drivers should be aware of the location and function of vehicle emergency equipment (fire extinguishers, red flags, flares, electric lanterns, fuses, first aid kit, rubber gloves, goggles, rubber boots, self-contained breathing apparatus, etc).

II ADDITIONAL AREAS OF TRAINING

In addition to the areas of training covered by Regulation 347, the following areas are recommended to be included in all driver training programs:

1) **Defensive Driver Training**
   a) defensive driver training under all weather, load and road conditions.

2) **Safety Requirements**
   a) driver responsibility for reporting inoperative or unsafe equipment/vehicles to his/her employer (required under the *Highway Traffic Act*);
   b) driver/owner responsibility for routine inspection and maintenance of vehicle (required under the *Highway Traffic Act*);
   c) first aid.

GUIDELINE C-13
(formerly 14-15)

Engineered Facilities at Landfills that Receive Municipal and/or Non-Hazardous Wastes

Legislative Authority:

Environmental Protection Act, RSO 1990, Section 27

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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SYNOPSIS

This guideline sets forth the requirements for engineered facilities at new or expanded landfills during the "comtaminating life span" of the landfill. The guideline applies to new or expanding landfill sites that receive municipal and/or non-hazardous wastes. It provides information to be used both by the proponent of a new or expanded landfill site and by the Ministry staff responsible for the review, evaluation and approval of such proposals.

1.0 Introduction

This guideline addresses engineered facilities at sites receiving municipal and/or non-hazardous waste. It is designed to ensure that the surrounding environment will be capable of attenuating the contaminants remaining in a closed landfill to the levels required by Guideline B-7: "Incorporation of the Reasonable Use Concept into MOEE Groundwater Management Activities". In particular, this guideline addresses the Ministry's approval of landfills that incorporate liners and leachate collection systems.

2.0 Position Statement

In order to protect the environment and human health, the Ministry will review and evaluate applications for new landfills and landfill expansions in accordance with the following position statement:

"Any engineered landfill facility shall be designed, constructed, operated and maintained to function effectively for as long as required for the protection of the environment. If periodic or continuous maintenance or replacement is required, evidence must be provided by the applicant that this can and will be accomplished".

3.0 Reasonable Use Concept

This guideline is written in accordance with Guideline B-7: "Incorporation of the Reasonable Use Concept into MOEE Groundwater Management Activities".

4.0 Definition

Contaminating Life Span:

The period of time during which the landfill will produce contaminants at levels that could have unacceptable impact if they were to be discharged into the surrounding environment.

5.0 Scope

This guideline applies to new or expanded landfill sites which receive municipal and/or non-hazardous waste and to Ministry staff responsible for the review and evaluation of such proposals.

6.0 Ministry Responsibility

The Ministry shall review and evaluate all applications for new and expanded landfill sites in accordance with the position statement (Section 2.0) and Procedure C-13-1.

7.0 Applicant's Responsibility

The applicant will be responsible for providing Ministry staff with sufficient evidence to adequately review and evaluate the proposal.

7.1 Service Life

It is the applicant's responsibility to define the service life of an engineered facility and indicate the frequency of replacement and the number of times it must be replaced.

7.2 Contaminating Life Span

Applicants shall address the contaminating life span of the landfill, equate this with the proposed service life of the engineered facility, and support any procedures they intend to use to ensure that the service life of the facility exceeds the contaminating life span of the landfill.

8.0 Further Guidance

Further guidance with respect to the use of landfill liners, leachate collection and treatment facilities, landfill covers and rapid stabilization and leachate recycling is provided in Procedure C-13-1: "Engineered Facilities at Landfills that Receive Municipal and/or Non-Hazardous Waste".

PROCEDURE C-13-1
(formerly referenced by 14-15)

Engineered Facilities at Landfills that Receive Municipal and/or Non-Hazardous Waste

APRIL 20, 1988
REVISED MARCH, 1993

MINISTRY OF ENVIRONMENT AND ENERGY

ENGINEERED FACILITIES AT LANDFILLS THAT RECEIVE MUNICIPAL AND/OR NON HAZARDOUS WASTE PROCEDURE C-13-1

(APRIL 20, 1988 - REVISED MARCH, 1993)

This procedure addresses engineered facilities at sites receiving municipal and/or non hazardous wastes and applies to the assessment of new landfills or landfills requiring expansion. The term "facility" as used in this document refers to the entire system or the individual components of a system that is established to serve a particular purpose. For example, the term would apply to an entire leachate collection system or the pumps and pipes that may comprise that system. Although the general engineering principles on which this document is based are applicable to closed landfills or landfills requiring remedial measures for contaminant control, the document itself is not intended to address such landfills and its specific requirements may not be applicable. Engineered facilities at sites receiving hazardous wastes, as defined by Regulation 347, will be dealt with on a case-by-case basis.

Some level of engineering is necessary for all modern landfills both for the protection of the environment from the discharge of unacceptable levels of liquid and gaseous contaminants, and for aesthetic reasons. The specific engineered facilities that are required on a particular landfill depend on the environmental conditions that are present and the type of waste, and thus can only be judged on a case-by-case basis. In some cases, this may entail only simple ditching or grading for the control of surface run off, in others complex leachate and gas control facilities may be required. The scope of the term "engineered facility" is discussed in Attachment A.

Landfills must meet the requirements of Guideline B-7 entitled: "Incorporation of the Reasonable Use Concept into MOEE Groundwater Management Activities", which limits groundwater contamination from waste disposal sites.

POSITION STATEMENT

It is the Ministry position that there are limitations to engineered facilities. Preferred sites for engineered facilities are those in environments with characteristics that provide a high degree of natural protection or where there is no useful or potentially useful groundwater resource. This is discussed further in Attachment B.

The acceptability of an engineered facility for a new landfill or a landfill that is expanding will be judged in accordance with the following:

> **"Any engineered landfill facility shall be designed, constructed, operated and maintained to function effectively for as long as it is required for the protection of the environment. If periodic or continuous maintenance or replacement of an engineered facility or its parts is required, evidence must be provided by the applicant that this can and will be accomplished. It is the applicant's**

responsibility to define the service life of an engineered facility and indicate the frequency of replacement and the number of times it must be replaced. In so doing, the applicant must address the contaminating life span (i.e. The time period during which the landfill will produce contaminants at levels that could have an unacceptable impact if they were to be discharged into the surrounding environment) of the landfill, equate this with the service life of the proposed engineered facility, and support any procedures intended to ensure that the service life of the facility exceeds the contaminating life span of the landfill". The Ministry will review and evaluate the applicant's proposal.

Engineered facilities (or combinations of facilities) must meet the following requirements:

1. It must be possible to monitor the engineered facility to verify that it performs to specification. As monitoring facilities may be required for the Contaminating Life Span of the landfill, very long service lives or provisions for replacement may be required. Monitoring must be able to warn of failure sufficiently in advance to allow contingency measures to be taken. Contingency measures are designed to accommodate any unanticipated failure in the design or performance of a landfill and are not a part of the normal operation during the Contaminating Life Span of the facility during operation or post closure.

2. The Contaminating Life Span of the landfill must be addressed in the contexts of the service lives of the various engineered facilities that are used to control contamination. It should be noted that the Contaminating Life Span of a landfill is dependent on a number of factors, including the capacity of the environment that surrounds the landfill to attenuate the contaminants in the leachate, the characteristics of the wastes, and the design of the landfill and is therefore specific to a particular landfill site.

3. Provision must be made for the maintenance of an engineered facility and its operation for as long as is required under the Position Statement. An application must contain a detailed outline of;

    a) how funding will be provided,
    b) who will bear the short-term and ultimate responsibility for the facility,
    c) the length of time that the facility will be operating, and,
    d) recommendations as to the conditions under which the facility can be closed down or no longer monitored or maintained.

4. Manuals on the design of various types of engineered contaminant control facilities, such as covers and liners, are available. However, some of these are very specialized and are new technologies. Under these circumstances technical supporting data (eg: case histories and reports applicable in Ontario) on the performance of these systems are required.

5. It is the responsibility of the applicant to specify the time period for the decommissioning of an engineered facility. If this is not done the Ministry will consider that the facility will be required indefinitely and provisions for its perpetual care, maintenance and replacement must be provided.

This procedure addresses synthetic membrane and earth and clay liners, leachate collection and treatment facilities, synthetic membrane and "clay" covers and rapid stabilization and leachate recycling facilities. Other types of engineered facilities (see Attachment A) will be addressed if the need arises.

LANDFILL LINERS

Synthetic Membrane Liners: To function properly, a synthetic membrane liner (also called a flexible membrane liner) must retain its integrity (i.e. function as designed) for the Contaminating Life Span of the landfill. The following factors must be taken into account in considering synthetic membrane liners.

1. Synthetic membrane liners cannot be replaced when their service lives expire.

2. Improvement in the quality of the leachate with time is not well defined.

3. There is limited field experience with synthetic membrane liners in landfills in terms of their service lives.

4. Synthetic membrane liners may impede monitoring of landfills to provide early warning of impending failure.

Given the foregoing concerns, synthetic membrane liners will be considered on a case by case basis, taking into account the proposed/predicted Contaminating Life Span of the landfill, and the potential of the site to offer natural protection.

Earth and Clay Liners: Earth and clay liners may serve to reduce leachate discharge and confine leachate for collection and to attenuate some of the contaminants in leachate migrating out of a landfill. They may be used along or in conjunction with synthetic membrane or other types of liners. Applicants proposing to use earth or clay liners should address these matters in their submissions.

LEACHATE COLLECTION FACILITIES AND LEACHATE TREATMENT FACILITIES

To serve effectively leachate collection facilities and leachate treatment facilities must function for the Contaminating Life Span of the landfill. The state-of-the-art only allows an approximate estimate of how much the quality of the leachate in a landfill will change or improve with time. Therefore in the absence of data or site specific information on the Contaminating Life Span of the landfill, the Ministry must assume that the complete

attenuation of the contaminants in the leachate is necessary, and will require that provisions be made to maintain and operate collection facilities and treatment facilities in perpetuity.

Leachate collection facilities and leachate treatment facilities must be designed, constructed, operated and monitored by professional staff and require competent technical staff for their continued maintenance, repair and replacement. Where approved, the Ministry will require that adequate resources be dedicated to the maintenance of any leachate collection, treatment, transporting and disposal facilities for as long as the leachate remains a potential hazard to the environment.

LANDFILL COVERS

Synthetic Membrane Covers: Synthetic membrane covers are used to prevent or significantly decrease infiltration into a landfill in order to reduce the rate of leachate production. This reduction of infiltration retards decomposition and extends the Contaminating Life Span of a landfill. Consequently, this type of cover is not encouraged in situations where it would delay stabilization of the wastes. An applicant proposing such a cover must establish the Contaminating Life Span of the landfill and provide for maintenance and periodic replacement of the cover as long as required. In the absence of evidence to the contrary, this will be considered to be in perpetuity.

Synthetic membrane covers will impede the upward venting of gases, and in particular methane, and in so doing may increase the distance these gases migrate laterally. These concerns should also be addressed in submissions to the Ministry.

"Clay" Covers: Clay covers (covers incorporating fine textured earth materials) are also intended to reduce infiltration into landfills. Such covers require maintenance to ensure proper growth of vegetation and to prevent failure by erosion and fissuring. Resources for these maintenance activities should be identified by an applicant. An applicant proposing a "clay" cover, that is specifically designed for the purpose of controlling infiltration, must establish the Contaminating Life Span of the landfill and provide for maintenance and repair of the cover as long as required. In the absence of evidence to the contrary, this will be considered to be in perpetuity.

RAPID STABILIZATION AND LEACHATE RECYCLING

Rapid stabilization of a landfill is a process intended to accelerate the biodegradation of the waste and reduce the time period during which settlement is most rapid and the landfill produces its most highly contaminating leachate. Although the technology has been known for 15 to 20 years, and has been used in some operating landfills there is little documented information from practical successful operations.

While rapid stabilization will accelerate the biological degradation and leaching of a landfill it does not create a contaminant-free waste. A "stabilized" landfill still produces methane and a contaminating leachate.

Leachate recycling entails pumping the leachate produced from a landfill back into the landfill. This is the basis for most rapid stabilization operations but is also used as a means of delaying the handling and disposal of leachate by temporarily storing this leachate in the landfill. In most instances this will be a short-term measure and leachate, will eventually accumulate to a volume that exceeds the storage capacity of the landfill. Disposal must then be made in a manner acceptable to the Ministry.

Leachate recycling may create added hydraulic head on the base of the landfill and this will cause an increase in the amount of leachate discharge to the surrounding soils. It may also increase the production of landfill gas. These concerns must be addressed by an applicant in the design of a landfill.

An important aspect of this Procedure is the requirement that, if the Contaminating Life Span of the landfill is not addressed in an applicant's submission, it will be assumed that certain engineered facilities must function in perpetuity. Rapid stabilization of the landfill is the only known method of shortening this Contaminating Life Span so that contaminants released to the environment can be attenuated by natural processes. In light of the shortage of practical field data on this process, submissions should be conservative and should be supported by practical contingency measures in the event that stabilization is not as effective as predicted.

CONCLUDING STATEMENT

This procedure may restrict the use of engineered facilities as a means of landfilling in sensitive hydrogeologic environments. However, the level of control required is necessary to protect Ontario's clean environment and valuable ground and surface water resources. Where some reasonable level of natural protection is present or where practical contingency measures are possible, engineered facilities will be considered on a case by case basis.

Attachment A

SCOPE OF THE TERM ENGINEERED FACILITY

This procedure applies to all engineered facilities associated with the control of contaminants produced from landfills that receive municipal and/or non-hazardous wastes. This includes but is not restricted to, the design, installation and maintenance of:

a) Liners, or combinations of liners beneath landfills (synthetic membrane, earth, clay, etc.)

b) Landfill covers, (synthetic membrane, earth, clay, etc.)

c) Leachate collection facilities (drains, tiles, ditches, etc.)

d) Gas collection, utilization, treatment, interception and venting facilities.

e) Monitoring facilities (for ground and surface waters and for gas)

f) Leachate treatment facilities

g) Facilities for the control of contaminated groundwater (purge wells, grout curtains, etc.)

h) Facilities for "stabilizing" a landfill or decreasing the time during which the landfill produces contaminants

Attachment B

PREFERENCE FOR NATURAL PROTECTION LANDFILL SITES

Engineered facilities are used to compensate for deficiencies in the ability of the natural environment to attenuate the contaminants produced in a landfill. However it is the Ministry position that there are limitations to engineered facilities and therefore sites in environments with characteristics that provide a high degree of natural protection or where there is no useful or potentially useful groundwater resource are preferred.
This position is based on the following rationale:

a) A landfill will produce leachate that, depending on the particular environment, has the potential, for a very long time, to cause contamination. This time is almost certainly more than 50 years and could be more than 100 years. Even a landfill that has been "stabilized" will produce a leachate that may be of environmental concern. Thus, if there is a groundwater resource present that must be "protected", some natural attenuation will be required at all sites after the service lives of the engineered contaminant control facilities have expired.

b) There is, for the most part, less than 30 years of experience on the performance of engineered leachate control facilities and in particular flexible membrane liners in landfills and leachate collection systems. Although short term field and laboratory data can be extrapolated to predict the long term performance and the service lives of engineered leachate control facilities, in the absence of long term field data some uncertainty remains.

Guideline C-13 does not preclude landfills that rely on engineered leachate control facilities for environmental protection. However, such sites should be located where monitoring and contingency measures are workable so that if the engineered leachate control facilities fail prematurely, environmental damage will be limited. Where there is reason to believe that the quality of the leachate will not be acceptable when the service life of the initial leachate control system has expired, provision must be made at the outset for successive measures to be implemented to control the leachate, and its impact at the site boundary, as necessary.

GUIDELINE C-14
(formerly 14-16)

Prohibition of Waste Oil for Use as a Dust Suppressant

Legislative Authority:

Ontario Regulation 347, Sections 5(4) and 9

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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1.0 INTRODUCTION

2.0 DEFINITION

3.0 USE ON COAL PILES

4.0 CERTIFICATES OF APPROVAL

SYNOPSIS

The primary purpose of this guideline is to eliminate the potential for environmental contamination that would be caused by the use of waste oil as a dust suppressant. The only exception to the ban on the use of waste oil as a dust suppressant is for use on coal piles when the waste oil is generated "on-site" (which may include waste oil from other sites operated by the owner of the coal pile).

This guideline will be enforced by denying Certificates of Approval authorizing the use of waste oil as a dust suppressant and during the normal abatement and enforcement activities of District staff and Investigations and Enforcement Branch staff.

1.0 Introduction

As a means of reducing the potential for environmental contamination, O. Regulation 347, Section 5(4), prohibits the use of waste oil as a dust suppressant.

2.0 Definition

Waste oil:

Any oil no longer required for its intended use; such oils would include crankcase, hydraulic, electrical and emulsified oil or mixtures of such oils and any other materials

3.0 Use on Coal Piles

Waste oils may be used as a dust suppressant on coal piles when the waste oil is generated "on-site" (which may include other sites operated by the owner of the coal pile) and shall be controlled using a stringent Certificate of Approval mechanism.

4.0 Certificates of Approval

Certificates of Approval authorizing the use of waste oil as a dust suppressant other than on coal piles shall not be issued. Any existing Certificates of Approval for such activities shall be revoked.

GUIDELINE C-16
(formerly 14-18)

Hazardous Waste Categorization and Review

Legislative Authority:

Environmental Protection Act, RSO 1990, Section 25
Ontario Regulation 347, Section 1

Responsible Director:

Director, Program Development Branch

Last Revision Date:

April, 1994

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1.0 INTRODUCTION

2.0 GUIDANCE MANUAL

2.1 Volume A-Listing
2.2 Volume B-Listing

SYNOPSIS

The primary purpose of this guideline is to ensure that wastes that could adversely affect human health or the environment of Ontario are properly controlled.

Procedure C-16-1: "Guidance Manual for Hazardous Waste Categorization and Review Program", outlines the requirements and process for the listing (categorization) and delisting (review) of wastes. It provides direction to Ministry staff responsible for the evaluation of listing and delisting applications and provides information to the public and to industry on the requirements and process.

1.0 Introduction

O. Regulation 347 employs a testing/listing approach for the definition of hazardous wastes. In instances where testing is not feasible (e.g., toxicity) or is not necessary, wastes are classified by listing in schedules. O. Regulation 347 also allows the listing (categorization) of additional wastes on the schedules, and the delisting (review) of specific non-hazardous wastes (on a site-specific basis) from the schedules. The implementation of this process is by amendment to the Regulation.

2.0 Guidance Manual

A two-part Manual (Procedure C-16-1) has been prepared to explain the application requirements and to outline the Ministry's evaluation procedures.

2.1 Volume A-Listing

Procedure C-16-1 (Volume A): "Guidance Manual for Categorization of Hazardous Wastes in Regulation 347" provides details of the listing process. Members of the public, industry or government may initiate the listing process by directing a request for the examination of an unlisted waste (believed to be hazardous) to the Program Development Branch of the Ministry.

2.2 Volume B-Delisting

Procedure C-16-1 (Volume B): "Guidance Manual for the Review of Wastes Listed in Regulation 347" provides details of the process and information required to "delist" a specific waste from a specific facility. Applications for delisting should be directed to the Program Development Branch of the Ministry.

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